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Some Wood-working Machinery Reviewed.

IN our recent notices of wood-working machinery and other appliances in the Building Exhibition, we spoke favourably, and justly so, of the exhibits of several firms; but on account of the wide field occupied, our details had to be, of necessity, brief. The section devoted to wood-working machines was a most important one, and it comprised a number from different firms designed to effect the same purpose in the conversion of wood into the usual forms incidental to joinery and house-building wants. In general construction several of the machines were not unlike each other, though in action and the mode in which they performed their work there were modifications as regards the arrangement of parts and their adjustment. In the remarks that follow we will be sparing of technical terms and in the use of phraseology of a scientific kind not understood even by the majority of those who use, or benefit by the use of, wood-working machinery. Our primal object is to lead to improvement in construction and application, and thus to benefit the builder and the workman. Simplicity in make, economy in cost, and efficiency in working are among the prime essentials in all machinery, of course not omitting durability. These conditions fulfilled will tend to the benefit of all parties,—manufacturers and users. In the whole range of wood-working machines, perhaps the simple hand-lever mortising-machine is the most generally useful and efficient operator; but its construction is not the triumph of any single designer or maker. The hand-mortising machine will soon be found in every builder's workshop in the three kingdoms; indeed, it may be said it is there at present. A quarter of a century ago and upwards, the mortising-machine in use depended on the action of a treadle, the foot instead of the hand effecting the necessary downward pressure of the mortise-chisel. The treadle machine was not a success, and the removal of the core in connexion occasioned much loss of time,—time often equal in duration to that spent in cutting the mortise. The first hand-lever machine was a decided improvement on its predecessors, and subsequent subsidiary improvements have resulted in the machine which is to be found in most building workshops. The success of the principle of the simple mortising-machine has led a number of inventors or so-called improvers to give it a composite character embracing tenoning, boring, cutting, drilling, and sundry other operations. While, however, some of these additional operations are fairly successful in themselves, the composite machine as a whole is not in its present state generally efficient. Various devices have been adopted for several years to make the mortising-machine applicable to tenoning, but only with partial success. The first efforts were through the employment of two chisels, or a forked chisel, the space between representing the thickness of the desired tenon. As the grain of the wood had to be cut against, an increase of power was necessary, causing a strain on the working parts of the machine, and tiresome labour to the workman. The tenon was roughly cut, and where the chisel was applied to the cutting of the shoulder of the tenons, the work was equally rough, unsatisfactory, and unfitted for any but coarse carpentry and joinery framing. The saw was next applied in connexion with the mortising-machine by vertical action, and the latest application was to be seen in the Building Exhibition. This tenoning attachment is an earnest attempt to add to the usefulness of the mortise-machine, but we dare not say it solves the difficulty, or that it will prove eminently successful. Two saw-blades are fixed and spaced in a vertical frame, and this frame can be readily enough attached as a chisel can to the socket made for receiving it. The tenon is cut fairly well, but another operation, and on a machine apart, is needed for cutting the shoulders on either side. Here, then, is a loss of time, which to obviate in connexion with the mortise-machine would necessitate new and perhaps complex arrangements. Apart from the mortising-machines there are saw-benches in use at present which perform the tenoning operation by the circular saw and by two saws adjustable to any space between them to represent the desired thickness of tenon. One of the latest introductions on this line was shown in the Building Exhibition, and it very rapidly and efficiently, and indeed cleanly, performed its work, though not as a whole. These two circular saws cut the tenons, but the shoulders had to be cut and removed by operations apart. This saw-bench is capable, without any complex arrangement, of being made a complete tenoner, and we would advise the manufacturers to devise a simple improvement to that end. The bench can be made generally applicable for single and double slitting and cross-cutting, either in relation to shoulders, tenon-cutting, or ordinary cross-cutting within certain limits incidental to joinery material for framing purposes. There is a "general joiner" by a London manufacturer known to our readers, but not shown in the Exhibition this year, which fairly accomplishes its work of tenon and shoulder cutting. This, however, is a combined or composite machine, and while adapted to the wants of large employers, it does not meet the needs of the small and struggling class. Cost, of course, is a great consideration with the many, and it will be so always. General and Universal Joiners are steam-driven machines, but what will meet the pockets and the business wants of the very large class of small builders and others are hand-working machines, and there is a demand for these that should be met. The exact saw-cut tenon cannot be improved upon by chiselling or knife-cutting, chipping, or shaving processes. In tenoning, the arrangement whereby the cheeks are removed entire by the saw, cutting with the grain, and across the grain, for the shouldering, presents the best and most profitable system of all.

Planing-machines, including moulding, have been made and tried in various ways, and at present there are two general methods in use: one in which the knife or cutting instrument chips away the material, and the other in which shavings are taken off in a similar manner as is done by the trying-plane or panel-plane. For certain desired ends, and within certain limits as to size of material, both machines have their respective advantages, but they are capable of much improvement, and doubtless will be further improved.

In examining one of these planing-machines, we threw out a suggestion to a manufacturer, and we were agreeably surprised when we had pointed out what could be done, to be told by him that he had partly anticipated us, and was engaged in carrying out the improvement. Our suggestion was in relation to the planing-machine that takes off the straight shaving. If a pilot cutting tool or "rougher" were made on the planing-table to precede the action of the finer set tool or tools (with a lifting action in connexion with each) better work would be performed, and much time saved which has to be expended in the taking out and sharpening, where only one plane or cutting instrument is engaged (or a series fixed in the one adjustment). A simple illustration will make clear what we mean. The ordinary house joiner uses a jack-plane or rougher for initial operations, to be followed by the trying or levelling plane. The irons of the jack-plane are set so as to take off a thick shaving in reducing quickly the overplus stuff, or is used otherwise to remove the surface roughness of the wood, often full of gritty and sandy matter, which, if it had to be travelled over by the trying-plane, would blunt or gap the plane-iron immediately, and render its constant sharpening a necessity, and a source of constant trouble to the workman, not to speak of the unsatisfactory execution that would result. In either form of planing or moulding machines, pilot cutting action would be a desirable improvement, and in connexion with steam-driven machines very little additional power would need to be expended.

There are other features or requirements which inventors and manufacturers have too often overlooked in the design and construction of wood-working machinery, and particularly in relation to hand-working operations. With some machines there is a loss of time occasioned in presenting the material, whether it be in the form of raw material, a squared form, or a moulding to be operated upon for more advanced stages of joinery work for finishing purposes. We will cite one little hand-machine of recent introduction, of which two or three examples slightly differing from each other are at present before the public. Take the mitre-cutter, for instance. This machine cuts a mitre at one or more operations, according to the size or thickness of the material or the diagonal to be traversed. The initial mitre being once cut, there is a necessary reversion of end for end of the length of moulding to cut the second mitre; for to mitre with any fair degree of expedition with the machine, the workman is obliged to cross-cut in lengths his panel mouldings (leaving a little overplus on them). With the machine mitre-cutter it would be rather awkward and tedious to manipulate in long lengths of mouldings. With the old form of mitre-block used in builders' workshops, and still in constant use, the workman can take up a 12 ft. length of moulding, adjust it in an instant in his mitre block, cut his mitre, shift his moulding length, and cut his second mitre exactly to his mark. An expert joiner, with a fine tenon-saw and exact mitre-block, can cut or mitre the mouldings for any number of door or other square panels, and put every one of these in from the saw, without taking a shaving off the mitre with his bench or shooting plane. For all work intended to be painted the moulding put in from the saw is the best method. In its present form the mitre-cutting machine will not replace the workshop mitre-block or the saw or plane of the workman. Of course it is likely to be improved upon, and it is open to considerable improvement by a different arrangement of the leverage and cutting tool. To be efficient a mitreing-machine needs to be simple, compact in form, and possessing lightness with strength. Accuracy, of course, is indispensable. Whoever intends to improve the machine mitre-cutter could not do better than watch the operation of the joiner using the old mitre-block, and endeavour to provide an instrument that can be used as handily and as readily on the bench. To effect this the line of direction in any new mitre-machine must be somewhat similar to that followed by workmen using the mitre-block, and this is not only possible, but quite feasible, with a little thought.

A compound mortising-machine, mitre-cutter, &c., has just been brought out, on the quadrant principle of adjustment. By shifting the quadrant, so to speak, a different inclination is obtained, and in respect to mortising, the leverage action lifted up to answer the depth of the material to be operated upon, and to offer a suitable range to the chisel. Within certain limits this machine may be found to answer in its composite character, but as a bench mitre-cutter for the ready use of the workman it cannot be expected to meet the desired ends. We have not as yet seen enough of its action to pronounce definitely upon it as a whole. The small planing-machine, suitable for squaring sash and other materials, within the limits of a few inches of breadth, depth, or thickness, is a fairly useful machine. It may be called rather a chipper by rotary motion than a planer; for, properly speaking, it does not take long shavings off. It does its work accurately enough to "set out" and gauge from where required. From it the material may be put together without any further surface-finishing save that of the smoothing-plane, and this operation in many instances may be left until after the framing is wedged and the work ready for moulding. The rotary cutters or "chippers" leave a burr after them, and in the case of mouldings a fine shaving or good glass-papering is needed for finishing.

Band-saw machines, of which there are several, simple and composite, are very serviceable operators, and the former can be made still more efficient. Those in which the table is convertible into a falling one, when required to cut on the rake, are advantageous in various ways. We may suggest here that those with the stationary table may be utilised to cut material or forms also on the rake by the simple adoption of a moving saddle, raked or bevelled to the angle or inclination it is desired to cut the stuff, be it curved or straight. Machines for moulding curved forms, to perform their work satisfactorily, need that the "cants" or "sweeps" should be in short sections, and partly with the grain of the wood; for moulding by machinery, or, indeed, by the common form of hand-moulding plane, cannot be satisfactorily executed blank across the grain or at right angles to the grain of the wood. Curved or circular moulding, therefore, necessarily leads to complexity in the arrangement of the machine through fences and adjustments. The large circular saw-bench and the large vertical saw-frame containing several saws need hardly be brought into comparison with each other. The former is generally serviceable for slitting or ripping stuff, for framing, and a variety of ordinary purposes, from 1 in. up to 6 in. or more, but for 9 in. or 11 in. deals or leaves, or the conversion of balks or logs, or deep timber of any description, the frame with its series of vertical saws is of course the proper converter. It is the primitive principle and action of the pit-saw used by a trade or class of workmen who are now almost extinct as a trade. The frame-saw, or rather the frame with its series of saws working in unison, and steam-driven, is a necessity of the time, and, considering its make and the power that is necessary to drive the saws, it performs its work with a very considerable degree of speed and with little waste of material.

Dovetailing-machines were not shown in the present year's exhibition. Several attempts have been made to produce an efficient dovetailer, but the most successful machine of which we have any knowledge was that which was shown in last year's exhibition, the invention of an Irish gentleman, who expended eight years in its construction. The cost of this machine, even if entirely successful in every other respect, will preclude it finding its way into the hands of certain classes of small workers, or workmen and masters combined, to whom it would prove useful, and within certain limits advantageous. As an operator, the dovetailer we are alluding to performs its work with considerable speed and accuracy. Its action is by a treadle, and a peculiar and swaying motion is given to the small circular saw which expeditiously and cleanly cuts the tails and corresponding pins of the dovetails. This machine cuts nearly all forms of tail and pin, simple and compound, secret or on the mitre, and it is without question a most ingeniously-contrived machine. One or two other forms of dovetailing machines are at present in limited use, but they do not meet the general needs of joiners, cabinet-makers, or others. One of these is not, properly speaking, a dovetailer, as the pins it cuts are straight or square, but its execution will answer for certain forms of box and case and other work. It is a cheaper mode, but not so artistic or strong as dovetailing. We may add here that a greatly splayed dovetail is a great mistake, and the less splay in a general way the better. A tail that is widened too much at its extremity involves a corresponding pin, and instead of adding to the strength of the construction, weakens it. Dovetailing by the old workshop method is a somewhat slow process, therefore the introduction into the market of a cheap and efficient dovetailer would be the supplying of a need. Dovetailing by the old hand-process of saw and chisel will, of course, be always more or less practised.

To sum up, then, our notes concerning wood-working machinery in a general way, it may be candidly said much has been accomplished, and much is still tentative and experimental. Some of the large composite steam-driven machines, general and estate joiners, are efficient workers where the work does not require that accuracy essential in more delicate operations. Those intended for superior work need further improvement and less complexity. To the hand-working machines and their construction renewed attention might be usefully paid, an attention that is sure to repay the designer and manufacturer in all successful instances. We have enough of mere novelties, and, indeed, of specialties too, each year bringing forth several, one manufacturer often striving to checkmate another in presenting a machine with a little modification to effect a like operation, and, we fear, in more than one instance running counter to patents which have been overlooked, and eventuating in loss, if not otherwise in law costs. To enlarge the sphere of machinery, and to extend its benefits, it cannot be too plainly put forth that, whether intended for steam-power or hand, it should be further cheapened; but in producing this economy efficiency must not be sacrificed, and simplicity must be studied. Complex hand wood-working machines are a mistake; but if people will have machines very composite in character they must be prepared for the drawbacks attending their use. One word more at present, and it is to say, what need scarcely be said on our part, that what we have written is put forth with a sincere desire of leading to improvements, and thus benefiting alike, if we can, manufacturers and users, and advancing all interests involved.

PROGRESS OF THE ART-MANUFACTURES OF RUSSIA.

THE records concerning the industries of Russia in ancient times are exceedingly meagre, and form a favourite subject of reseach of the Russian *savants* of the present day. We know that, at a very early period of her existence, the mechanical industry was chiefly limited to the production of household appliances and various requisites of wood. Articles manufactured of metal were obtained from Greece, with which country Russia conducted a considerable barter trade in raw products. History informs us that at a grand feast given by Vladimir the Great, in the year 994, wooden spoons were used, and it is supposed that, at that period, the art of wood-turning was known in the country. We are told that the goldsmiths and silversmiths of the ancient commercial Novgorod already, at the period of the Tartar domination, had acquired great fame for the delicacy of finish of their productions, and were without rivals at the courts of the half-savage Mongolian khans, where they found a good opening for their wares. We learn that, in 1247, a certain Russian artisan (Kozma by name) constructed for the khan an ivory throne set with precious stones. The regular manufactures of Russia commenced, as in other countries, with the beginning of its political importance, which may be said to date from the reign of the Czar Ivan III. (1462). But the civil war before the accession of the house of Romanoff, and the interference of Sweden and Poland, checked the infant manufactures, so that nothing was done substantially in this direction until Peter the Great came to the throne.

It is a curious fact that industrial undertakings in Russia were always looked upon as a State matter. The foreign artisans invited from abroad, and who were engaged in professions with which the Government could not possibly have anything to do, entered as it were Government service, and received Government pay. This relation asserts itself still more prominently in the reign of Peter, when the manufacturing industry becomes purely a State matter in the fullest sense of the word. This policy was very likely necessitated by the backwardness and conservatism, if it may be so called, of the Russian people; these defects are clearly demonstrated from the manner in which Peter was wont to treat his subjects. A very curious instance of this is seen in the Czar's oukaz to the senate in the year 1723, in which he says, "Our people are like children who are not fond of learning, who will never take to their alphabet without being driven to it by the master, and who at first feel annoyed, but when they have learned, thank their instructor." Peter, this most extraordinary potentate and great reformer, may be said to have given to his subjects nearly every art of civilised life, of which they were some time afterwards found in possession. A century and a half ago, on the spot called the Imperial Peterhof, where in the present day rise palaces and country seats surrounded by parks and gardens, with fountains rivalling those of Versailles, prevailed dark forests, swamps, and marshes. One of the most conspicuous structures in Peterhof is the Imperial Stone Cutting and Polishing Works. "The Diamond Mill," which was the original name of this establishment, called so after the precious stone which was worked there, was established by Peter the Great in 1725, just a fortnight before his death. It is believed that this was the last act performed by the Emperor for the benefit of his country, for carrying out the idea ever present in his mind of introducing into Russia the sciences and fine arts. The immediate object of forming this establishment was the utilisation and working of the splendid minerals obtained in the Ural and Altai mountains in Siberia, known under the name of *pietra dura*, or hard stones, such as jasper, amethyst, chalcedony, nephrite, agate, &c., likewise that beautiful ore of copper,—malachite. Another object in view, according to the original statute, was "the formation of skilled master-workmen, who, combining theoretical knowledge with practical skill, could be appointed as inventors and master-workmen to other stone-cutting and polishing works." Elizabeth, the daughter of Peter the Great, extended the "Diamond Mill," and caused it to be supplied with new machinery. During her reign, the first attempts were made in imitating Florentine mosaic, some samples of which may be seen at Oranienbaum, near Peterhof, in the Chinese palace, which are, however, of no special merit. In 1775 a new building was erected on a more convenient site, near the Gulf of Finland, and the old "Diamond Mill" transferred thither. At this period the works became firmly established, and had succeeded so far as to be able to prepare artisans as well as master-workmen, able to form similar establishments at Ekaterinburg and Kolivan, in Siberia. Some of the artisans were recruited from the Government Foundling Hospital, and other workmen were *adscripti*, like a distinct class of subjects. Thus the desire of Peter the Great to promote in Russia science and fine arts, and among these carved and chased work in relief and mosaic work, was gradually realised, and a hundred years later, at the Paris Exhibition of 1867, the productions of Peter's "Diamond Mill" were characterised by artistic merit of the highest order, so that they astonished the foreigners, who paid no small honour to Russian artistic skill by pronouncing them to be above all prizes,—*hors de concours*. We learn that at the commencement of the undertaking the mosaic work progressed but slowly, even under the superintendence of foreign artists. The establishment obtained from abroad repeatedly foreign superintendents, to whom were paid large salaries, but with no beneficial result. At last, in 1850, it was resolved to send a Russian master-workman to Italy to learn the business in all its details, in which he was eminently successful, and on his return introduced the art of mosaic manufacture in all its perfection, so that the Peterhof artisans have now become so expert in this branch that, according to the report of specialists, they have surpassed even their teachers, the Italians, in the judicious and careful selection and disposition of coloured stones of various shades, in the precise execution of every detail, and in solid workmanship.

Among the recent productions of the Peterhof works which are really meritorious may be named a round table of Florentine mosaic, with bronze mountings; a round table with mosaic of lapis lazuli, mounted in bronze; a square table composed of mosaic vine-branch and red currants; letter-weight with ornamentation in relief mosaic; letter-weight, with flowers in relief mosaic; a pair of oval tazzas of nephrite, with pedestals of the same material; a pair of square vases of nephrite; and a cabinet in lapis lazuli ornamented with bronze. For beauty of design, gracefulness of form, and brilliancy of colour, all these objects can scarcely be surpassed by any country. One of the latest productions is a splendid large inkstand of black jasper, ornamented with a figure of Catharine II., and with bas-reliefs and other decorations in oxidised silver, and a pair of monster malachite vases, which are singularly beautiful.

The Government establishments of the Peterhof, Ekaterinburg, and Kolivan supply with their productions principally the Imperial palaces, which are eminently noted for the absence of mere gilt and parade. Among the articles of splendid material and exquisite workmanship which have been supplied by the Siberian works we may mention, a vase of Yamsky jasper, valued at 5,250 roubles (730*l.*); a pair of vases with pedestals of Kalkansky jasper, the pair, 8,500 r. (1,270*l.*); a vase of grey-violet Kargonsky granite, valued at 1,000*l.*; a large oval vase of orlets, a kind of cornelianite, a material which is very scarce and seldom found in great bulk, valued at 37,873 r. (6,000*l.*); and mantel-piece, etc., of green wavy Rovnevsky jasper, 10,759 r. (1,614*l.*). The above works furnish also table and *étagère* ornaments, such as tazzas, letter-weights, inkstands, seals, etc., of agate, rock crystal, aventurine, malachite, white chalcedony, amethyst, and other Siberian *pietra dura*. We may here notice a vase of Kalkansky jasper, with fruit and greenery of different coloured stones. There are also one or two private firms in Ekaterinburg who produce similar articles, and also a few St. Petersburg firms. While giving to these productions all their due as regards their splendid finish, there still remains much to be desired as regards their artistic originality. In the form and ornamentation there prevails a kind of stiffness, and in the matching of the stones there is a want of harmony. Similar articles manufactured by St. Petersburg firms suffer from the same drawback.

The same may be said of tables, *étagère* ornaments, and clock-cases of marble, jasper, malachite, lapis lazuli, etc. The workmanship, however, is generally very good, with perhaps too close an imitation of old foreign designs. It should be borne in mind that the enormously high prices of all these articles renders the sale of them very limited. Besides, similar art productions are imported from abroad which, notwithstanding the somewhat high duty, readily compete with those of native manufacture.

The territory of the Russian empire abounds in minerals of splendid quality and beauty, suitable for building purposes and elaborate decorations, such as granite, porphyry, marble, serpentine, labrador, malachite, &c. Although as regards the public buildings of St. Petersburg nothing can be more stately, it is surprising to find how little polished granite, which is in such favour in this country, enters into their composition, or that of the structures of the capital in general, although that material, of splendid quality and colour, is obtainable quite near, in Finland. It would appear that this splendid material, together with other valuable minerals, are reserved for the ornamentation chiefly of churches and palaces. The magnificent pile of the Cathedral of St. Isaac at St. Petersburg seems to have absolute mountains of granite and marble, forming the foundation and columns and exterior walls. In the interior the eyes are perfectly dazzled with the splendour of the immense quantity of gold mosaic marbles of various hues, pilasters of jasper, pillars of malachite, sacred pictures, statues, &c. Nowhere is the effect of malachite seen to such advantage and perfection as in the ten beautiful fresh green-colour columns of the material in front of the Ikonostas, or altar-screen, of white marble. The Cathedral of Our Saviour in Moscow, recently completed, is another magnificent temple built almost entirely of Russian material. The body of the church is in a kind of white freestone, and stands on a high foundation of polished Finland granite, which has a beautiful effect. The interior decorations are most gorgeous and costly, consisting of porphyry, granite, marble, labrador, and jasper. The latter material can also be seen in the four small columns of the Ikonostas of the Kazan Cathedral at St. Petersburg, which cost 60,000 rubles, or 9,000*l.* In 1850, at the Imperial Peterhof Manufactory, was established a separate department for the working of marble, where have been executed all the works in the Lower Peterhof Park, the decorations of the St. Isaac Cathedral, and sundry marble work at the Hermitage, or Imperial Museum attached to the Winter Palace, and at the Palace of Tsarskoye Selo.

The manufacture of porcelain commenced in Russia in the reign of the Empress Elizabeth, daughter of Peter the Great, who founded, in 1744, the celebrated Imperial Porcelain Manufactory at Alexandroffsky, near St. Petersburg, and which is still in existence. Up to the year 1810, however, the productions of Saxony were chiefly in use. From that period the manufacture of porcelain began to increase, the yearly production at the present day being estimated to be of the value of 2,000,000 roubles, which naturally appears insignificant in comparison with foreign production. The manufacture of earthenware or faïence has existed for a considerable period in Russia, but the first officially-known establishment for the manufacture of this article dates from the latter end of the eighteenth century. Since then their numbers have increased to about forty. The Imperial Porcelain Manufactory ranks first in Russia among all its compeers as a producer of artistic china. These works, from the very commencement, have used materials almost exclusively obtained in the country, and, like the principal establishments in Europe of the same kind, Sèvres, Meisen, and Berlin, manufacture chiefly articles in hard porcelain (*pâte dur*). The splendid exhibits of the Imperial Factory are looked upon in Russia as works possessing genuine and real artistic forms, ornamentation and painting serving not only as models, but as an encouragement to native art; they are deemed exquisite productions as regards the fine quality of the material, and the durability of the enamel and the exquisite moulded ornamentations; they are prized more especially as being the work entirely of Russian artisans and artists. The articles produced consist of dinner, tea, and coffee services of the very finest china, which are supplied for the use of all the imperial palaces, besides jardinières, carcel lamps, statuettes, cups, bouquet-holders, and large articles, such as vases, sometimes of extraordinary dimensions (over 7 ft. high), which, with the very high temperature required for some sorts of china, present not a few technical difficulties.

The imperial porcelain works are under the administration of the cabinet or chief office of the imperial domains. A most peculiar kind of economy is exercised in this establishment. It receives yearly from the cabinet of his imperial majesty the sum of 91,000 roubles (13,000*l.*) yearly to be applied as working capital, and this sum must be returned in the shape of the art-productions mentioned above. At the same time it is forbidden to extend the business of the works, notwithstanding the private orders that may be received, however profitable they might be. The works have a small technical school attached to them, attended by fourteen pupils. Children of the artisans receive instruction in practical work during a period of four years. They are taught sculpture, modelling, and painting. The principal object of this school is to prepare artists for painting on china and sculpture, with the view of filling up the vacancies that may occur through death or retirement. There is what is called the *magasin* attached to the works, where are sold articles slightly damaged; which serves at the same time as a museum of foreign models, which were acquired principally in the time of Count Peroffsky, minister of the Court in the reign of the late Emperor Nicholas; and for a permanent exhibition of the best productions of the works from the time of Catherine II. up to the present day. This museum is frequently visited by the lovers of art, both native and foreign. In judging of the merits of the articles produced at the imperial porcelain works we find that there is little of originality in the taste or design. But the copies,—especially of figures and groups,—taken from Dresden, Berlin, and other china, are not only not inferior to the copies produced latterly at Meisen, but are in a certain degree more exact, life-like, and artistic in outline and effect, and are incomparably cheaper. It should be remarked, however, that talent is deteriorating in such articles, as, for instance, a plaque with painted flowers, by the late Mr. Krassofsky; or a medallion with flowers, modelled from nature, in biscuit, by Mr. Ivanoff, who is also dead, and not likely to be equalled under existing circumstances. They were deemed inimitable, and were pronounced at the several international exhibitions, where they were shown, *hors de concours*. We may here notice some splendid specimens of the ceramic art exhibited in the *magasin*,—a large vase of the form *bandeau*, exquisitely painted, valued at 900*l.*; two of the form *amphora* and *fuseau*, priced at 75*l.* and 100*l.* respectively; a delightful goblet of Chinese design, valued at 100*l.*

Judging from the Russian industrial exhibitions, the manufacture of china and earthenware does not increase very rapidly. If we take into consideration that the bulk of the Russian people use wooden vessels and common red earthenware, it is easy to understand why the production in ceramics is so far behind Western Europe, at least, as regards the extent of the manufacture. There is, however, some considerable improvement in the manufacture of what is called stone china, and which is sold at prices sufficiently moderate for middle-class consumption. This is notably the case with the articles produced by Mr. Gardener in the Government of Moscow, the forms and designs of which are copies of the best English ware. With the abundance in Russia of native material of excellent quality, such as the kaolin of Gloukhovo, Borovilchef clay, the spathum and quartz of Finland, it may be expected that the success already achieved is only the beginning of further improvements. It is a most curious fact that the manufacture of plate window-glass and looking-glasses is almost unknown in Russia, notwithstanding a pretty high protective duty. Some time ago there was a talk of establishing plate-glass works near the capital; this undertaking, however, has not yet been realised. To say that this branch of industry is in a state of decadence would, therefore, be erroneous, for, strictly speaking, it never existed.

At the head of the ornamental glass manufactories stands the Imperial Glass Works of St. Petersburg, established in 1792, in the reign of Catherine II., which is the oldest establishment but one in Russia producing this class of goods.

It was established, like the porcelain works, with a view of supplying with its wares the numerous Imperial palaces, and on a similar basis. These works are now unrivalled in Russia for the perfection of the articles turned out, and fine quality of crystal glass, with bases of lead for lustres, candelabra, candlesticks, toilet services, ornamental and fancy crystal glass, — among these, vases, tazzas, jars, caraffes, distinguished for the brilliancy of their colours, gilding, and painting. Especially is this establishment noted for its articles in rich purpurine colour. As a specialty of these works, which it shows also with the Imperial Porcelain establishment, is the production of Easter eggs, which play such an important part in the ceremony of the Easter kiss, known to all who have lived in Russia. These eggs are manufactured in different sizes in cut-glass and china, in a variety of designs, gilt and elaborately painted, with the inscription of the greeting, "Christ is Risen." Many thousands of these Easter *cadeaux* are supplied to the Imperial Court, which are presented to the visitors on Easter Sunday. The eggs are made hollow inside, with an opening at the two extreme ends, through which are drawn bows of silk or satin. They are usually kept as *étagère* ornaments. The production of the Imperial Glass Works is rather limited,—1,500,000 pieces of various kinds of ornamental glass yearly. As to the prices of the articles, they have always been exceedingly dear. Quite recently an effort has been made to find private purchasers at lower prices, and with some success, affording a pleasing contrast to the unbusinesslike economy of the sister establishment, the Imperial Porcelain Manufactory. The principal articles produced at present by the Imperial Glass Works are enamels for mosaic work. The manufacture of enamelled mosaics was introduced in 1851 by the two brothers Bonifante, of Rome, and, undertaken at the Glass Works on Government account, in connexion with the decoration of the St. Isaac's Cathedral, has been eminently successful. The manufacture of enamels has been brought to such perfection that it is now possible to attain every shade of colour required for the reproduction of oil paintings. The gigantic sacred pictures in mosaic in the Cathedral of St. Isaac are deemed *chefs d'œuvre* of their kind, and it is considered that if the originals had been more perfect, their production would have formed an era in the history of Russian national art. Trials are being made in the reproduction of the well-known Moorish mosaic in faïence (azulijos), of Alhambra celebrity. Considering that the glazed tile stove, called by the Russians "Paitch," which, by the bye, is of Dutch origin, is almost universal in Russia, it is strange that so little progress has been made in the production of encaustic tiles. The tiles in general use are large, bulky things, hollow at the back, with common white enamel, which cracks almost as soon as the fire is lighted. In the houses of the rich the stove, built up of brick and mortar, is faced with white porcelain and ornamented with various devices, and altogether produces a very chilly effect. It is a curious fact that a century or so ago the Russian stoves were adorned with tiles of exquisite Oriental designs, with representations of leaves and branches in colours,—black and dark blue, with a good deal of orange. Some exquisite encaustic tiles are still to be seen in the walls of the ancient churches of Yaroslaf. Latterly, Mr. Bonifante, above mentioned, has introduced some encaustic tiles for Russian stoves in a variety of colours, as a trial; they are, however, too expensive for common use. He has also commenced the manufacture of majolica enamelled vases, &c.

There are altogether some half a dozen manufacturers in Russia of crystal glass, cut, plain, white and coloured, ornamental and fancy, the most noted establishment being that of Mr. Maltsof, which was founded just two years before the Imperial Glass Works, in 1790. Mr. Maltsof's goods are known all over Russia for their quality and taste and moderate prices, and have invariably carried off the first prize in the Russian department at international exhibitions.

We quote the following opinion of a Russian connoisseur as regards the state of ornamental painting on glass and china in Russia:—"Artistic painting on glass and china, in comparison with the rest of Europe, is confined to very few hands, and will never occupy anything like a conspicuous position in the production beyond the requirements of the general demand. We would therefore advise our manufacturers to limit themselves in this respect to simple ornamentation, devoting their especial attention to quality and taste of the articles. By this means alone will our goods be enabled to compete with foreign productions, but by no means in the painting of figures, landscapes, flowers, &c., for which there is a demand only amongst the comparatively wealthy few. It will take a long time to form the taste for such articles among the bulk of our consumers; besides, the means of the masses will not increase so rapidly as to afford them the means of purchasing expensive articles which are not of immediate requirement."

For fine gold and silver, we have seen some magnificent works, equal in excellence and delicacy of execution and harmony of design to the best works of England and France. The national love of designs purely Russian, which is so marked a feature in so many Russian products, is here specially manifest. Costly sacred vessels, furniture, and vestments, from the very commencement of the introduction of Christianity into Russia, formed indispensable appurtenances of the churches and cathedrals of Eastern orthodoxy, which were richly endowed with pious donations, silver and gold being the metals mostly in use, even with the comparative poverty of ancient Russia. The valuables in gold and silver possessed by the powerful Boyards and Grand Dukes of ancient Muscovy, passing from one family to another, at last, more frequently than not, found a final resting-place among the treasures of the Church. It is owing to this that there remain in Russia such numbers of ancient ecclesiastical vessels of exquisite forms and delicate workmanship. The goldsmiths and silversmiths of Moscow have begun lately to devote themselves to the imitation of these ancient models, such as potirs or cups, in silver gilt, lamps, candlesticks, gorgeous articles in the shape of shrines for the reception of the Sacrament, covers for the Book of the Evangelists in silver, gold, and enamel, forming part of the altar decoration, elaborate frames of chased work for sacred pictures, &c. Among the art productions of Russia should be noticed the celebrated niello work. All connoisseurs know that the Russian metal-workers have carried off the prize at every exhibition in this class, but not everybody knows that the art of producing genuine niello is entirely in the hands of the Circassians. Quantities of silver and gold niello work are manufactured at Tula, the Sheffield of Russia, which is sold to those who know no better as the genuine production of the Caucasus. A great deal of silver filagree work, an old industry in Russia, is also made here. Russia is also noted for her enamels. The production of *émail cloisonné* is an old industry; the ordinary modern enamel-cups, many of them, are exquisite both in design and colour. Of plated wares we have seen some very meritorious specimens at Russian exhibitions. The prices of many articles are moderate, as compared with English goods. In design there is little that is new. There is much room for improvement in this respect.

The Russian churches are all similar, both externally and in their interiors. In the latter they are adorned with a profusion of ornament. Few jewellers' shops could compare for splendour with the silver and golden ornaments of some of the Russian churches. The most conspicuous ornaments are the ikonas, or sacred pictures. These are frequently adorned with plates of gold and crowns of jewels, set in gorgeous frames, bedizened with precious stones. Before these burn lamps or innumerable wax candles,—votive offerings; all this, together with the ornate belongings of the Greco-Russian ritual, and the glitter and dazzling splendour, has a brilliant effect. To properly understand these art productions so peculiar to Russia, it should be explained that in the true orthodox ikonas it is only the face, hands, and feet that are painted; the rest of the draped figure is in silver gilt *repoussé*, the sunbeam-like halo round the head being in the same metal. The Moscow silversmiths already in the seventeenth century were far advanced in the art of etching and embossing of the figures, vestments, and borders of ikonas. There were, however, no skilled artists for the execution of the painted details. Most of the ancient ikonas are entirely destitute of artistic merits, and are somewhat remarkable objects. The complexion is almost Indian, the eyes small, the cheeks thin, the nose sharpened, the hair and beard scanty. In the present day a great improvement has been introduced in the ikonas. The painting is generally executed by qualified artists, while several novelties have made their appearance,—the execution in enamel of the ornamental parts in the Byzantine style, and the oxidising process in various colours, which imparts an agreeable play to the brilliancy of the gold, which, without this process, would present a heavy appearance on an even surface. These splendid ikonas are not only confined to the Church, but are found in the houses of the wealthy, especially of the rich native merchants and tradesmen. The various ikonas are contained in what is termed a *kiota*,—sacred image case,—frequently occupying the entire east corner of the room, and reaching almost up to the ceiling. A lamp is usually kept burning before the silver-gilt ikonas day and night, which is repeated in innumerable glittering rays. The cases are frequently made of expensive woods, elaborately carved, and with gilding. Although, according to the statutes of Eastern orthodoxy, figures in relief are prohibited, this prohibition in its full force applies only to rounded figures; but, as regards reliefs, more or less prominent, they are admitted, provided they are strictly in accordance with the text of the Scriptures. There was a time of severe persecution of carved or moulded image pictures, when both in churches and in private houses was confiscated every specimen that could be found of the sculptor's art, from the carved ikonas of St. Nicholas, the miracle-worker, to the crucifix, with the group in front, which are so frequently met with in the present day; but we have different times now, and the anathemas of the Holy Directing Synod are no more launched against the old relief pictures, which, if not quite artistic in their execution, are yet interesting in connexion with the history of art manufactures in Russia. The production of ikonas, then, has given a considerable impulse to *repoussé* work in gold and silver and enamel, and a wide field is open for the silversmiths of Moscow for the production of other church appurtenances, which, like non-sacred things in the present day, are subject to fashion.

Painting on Lava.

Among the novelties recently introduced into Russia is painting on prepared lava, which bids fair to become exceedingly popular. The first works executed on this material were eight immense ikonas or holy pictures for the new Church of St. Vladimir, at Sevastopol, the painter of which was the artist, Mr. Egoroff, of Moscow. The work, it is stated, is well executed, but the original models from which the artist was compelled to copy were so indifferent, so weak in their execution, that the immense labour of Mr. Egoroff cannot serve as a true criterion of the art of painting on lava. It is the opinion of competent judges that this art will find an extensive application in Russia for church decoration, principally for holy pictures, particularly as in that country the greater part of the churches are decorated with mural paintings in fresco on the interior, and especially on the exterior walls, but which, owing to the rigorous climate, are soon damaged or destroyed. In their opinion painting on lava has many advantages as compared with mosaic work; in the first place, mosaic is far more expensive, heavy, and, therefore, difficult to fix, especially if the picture has to be placed in an inclined position and high up; while the slabs, if an equal size with mosaic work, are incomparably lighter; in the second place, the durability of the painting on lava is quite equal to that of the mosaic material, and the joints or seams which have to be made when executing work of considerable dimensions are scarcely seen even at a short distance.

Furniture.

The manufacture of artistic and ornamental bronzes, such as candelabras, statuettes, clocks, vases, tazzas, &c., was commenced about the year 1820, prior to which French bronzes imported free of duty held possession of the market. It has been ever since in the hands of foreigners. The art has not attained any great development. The Russian public affect everything that is foreign, and the market for home productions being restricted, the price at which the latter are sold is not within the reach of the poorer classes; nor is there any division of labour, as in France, at Russian bronze-manufactories, where the same establishment and the same workmen undertake the casting of monuments as well as the manufacture of candlesticks. The dearth of skilled workmen is likewise sensibly felt in this branch of industry, where so much depends upon taste and design. The manufacture of bronze in Russia is protected by a duty of 5*l.* 9s. 3d. per cwt. At the several exhibitions held in Russia since 1851, notwithstanding the numbers of exhibitors of furniture, it cannot be said that the trade has ever been faithfully represented, for there has always been a lack of good, plain, serviceable furniture of a cheap description, which is so easily produced in a country where both wood and labour are so cheap. What is shown is mostly expensive artistic furniture, and has consisted latterly of imitation buhl, copies of the styles of Louis XVI., of the German furniture-makers of the sixteenth and seventeenth centuries, and of the First Empire. The articles exhibited were of excellent workmanship, and a good deal of taste was exhibited, but not one manufacturer could show anything original, anything out of the beaten track. Imitation French was the chief characteristic. We should notice here that some decided improvement has been made in the production of inlaid parquet flooring, combining undoubted taste with excellent workmanship.

For some time there has prevailed in Russia a spirit of patriotic nationality amounting almost to fanaticism, especially among the influential classes. This tends to induce them to encourage native manufactures and so-called Russian style, as a matter of national pride. A curious instance of this spirit may be noticed in the Stroganoff school of design at Moscow. In that school we are informed that the pupils who learn landscape drawing must copy none but Russian landscapes, those who study flowers must embody in their designs Russian flowers only, while designs of a more complex character are taken as far as possible from Russian illuminated missals or other works of early Russian or Russo-Byzantine art. Some short time ago the fashion set in for furniture in the national Russian style: such a style, however, practically does not exist; it had to be invented. So the peasant artisans of the province of Nijni Novgorod were set to work and encouraged to exercise their ingenuity in this department; the result was the production of the most curious pieces of furniture that can possibly be imagined, where the vulgarly gaudy distribution of bright colours, gilding, and varnishing vied with most unartistic forms and arrangements. These articles may be regarded more as curiosities,—as furniture they are totally unsuitable for the million, and they are exceedingly expensive. Then there were professional designers and reputed cabinet-makers, who undertook to introduce the Russian element in more artistic style, but who have not been very much more successful than their humbler brethren, the peasant artisans. The rage for the Russian style originated, no doubt, in the stale and monotonous repetitions of old designs.

A Russian writer on art manufactures says the following with regard to the so-called Russian style of furniture:—"The tendency which exists at present to become emancipated from foreign influence has asserted itself mainly in wood-carving and ornamentation with a medley of colours. While recognising all the merits of the so-called Russian style, we are compelled to acknowledge that it indicates the predominance of imagination over judgment more in accordance with the taste of Eastern nations. We do not wish to assert that Russian art has not advanced beyond the art of semi-barbarous peoples; we wish only to express our opinion that our artists have in this instance made a concession to the taste of the moment. All these imitations of the so-called old Russian style should be ascribed to the caprice and fancy of that class of people who, a short while ago, were busy erecting at their country residences izbas and peasant cottages in the national style, and who now wish to decorate them with furniture to match. This tendency does not in any way represent the general taste of the public,—the articles necessary for every-day requirements are made just as they were formerly. The enormous prices of those gaudy playthings called furniture point to the fact that they are only suited to the pockets of very rich people."

Decoration of Churches.

The pomp and splendour of the Russian churches is mainly supported by the pious donations of the rich, especially of the native merchant class, who are most liberal contributors. It is a common thing for a rich tradesman to contribute a donation of some 100,000 roubles to the church sacristy, for the purchase of ecclesiastical vestments and altar decorations,—which are made of magnificent tissues of silk interwoven with gold and silver thread, gorgeous alike in material and richness of design. Foreigners, without any veneration for things sacred, purchase largely this cloth of gold and silver for the purpose of making window-curtains and covering drawing-room furniture. It is the same with the unconsecrated ikonas or holy pictures, which are bought for chimney-piece ornaments. Much of this cloth of gold is exceedingly beautiful in design and workmanship. From the numerous patterns which are commonplace and gaudy there is no difficulty in selecting specimens of genuine Byzantine ornamentation. Some splendid designs can be met with in Moscow, carrying one's imagination to the East, to India, and Assyria. The price of this material ranges between 11s. 3d. and 11*l.* 5s. per yard. Needlework or embroidery in gold or silver is an ancient industry in Russia, and enters largely into church decoration of the most expensive kind, which the following prices, quoted by one of the leading embroidery establishments, will show:—Altar coverings of silk moiré antique or glacé, embroidered with gold, 300*l.* and higher, and with precious stones, 500*l.*; covering for the sacramental wine, embroidered with chenille or silk and precious stones, 150*l.*; a ploschanitsa (representation of our Saviour in the tomb), of velvet, embroidered with gold and precious stones, 700*l.*; banners, of velvet or moiré antique, embroidered in gold, with precious stones, 500*l.*

We referred above to the splendour of the ikonas, or holy pictures, and other belongings of the Russian churches. As an example of their great value, we may take those contained in the cathedral and churches in such an out-of-the-way place even as the manufacturing village of Paulovo, in the Government of Nijni-Novgorod:—The riza, or silver-gilt mounting, on the ancient ikona of Our Lady of Smolensk, valued at 500*l.*; the Book of the Evangelists, bound in silver-gilt, weighing 70 lb.; a tabernacle of silver-gilt, weighing 26 lb.; silver mountings on the ikonas, weighing 20 lb. and 26 lb.; the silver mounting on the ikona of our Lady of Smolensk, ornamented with large pearls, weighing over 1¼ lb.; the silver-gilt mounting of the ikona of our Lady of Kazan, containing 32,549 pearls and forty-nine brilliants; the silver-gilt mounting of a comparatively modern ikona of our Lady of Smolensk, weighing 11 lb., and decorated with 22,323 pearls. We are told that the treasury of the celebrated monastery of St. Sergius, near Moscow, contains ecclesiastical vessels, vestments, and other objects of enormous value. Of pearls, one may behold there, in the course of a few moments, more than one is likely to see in the course of a lifetime.

Wood Carving.

Some very fine specimens of wood-carving have also been shown from time to time at the several exhibitions. This art seems to be extensively practised in Russia. It enters largely into the decoration of the interior of cathedrals, churches, &c. It is worthy of notice that a favourite occupation of the Russian peasant in his leisure moments has always been wood-carving, in which he exhibits a particular dexterity; and the rural industry of wood-carving of every description has existed for centuries. Any one who has studied the ancient art productions of Russia, and who has seen specimens of the so-called ancient Russian monastic carved work, will be struck by the exquisite delicacy of taste displayed, which is all the more surprising considering the imperfect instruments and rough tools which were employed by these self-taught artists. These can always be found among the Russian people. As an example of what a common man can do in this way with almost useless worn-out chisels and knives, we may instance an article exhibited by a man-cook at one of the late exhibitions in Russia. It was a kind of miniature cabinet, made of a single piece of wood, in the most fantastic style imaginable, carrying one back to the Italy of the fifteenth century. On four model figures of lions which served as legs to the cabinet, rises a perpendicular rock or wall, and on it project structures of every style and character, from an Indian pagoda to a Romanesque cupola and castle watch-tower, reminding one of the Palace of the Dukes of Ferrara. This ingenuity of the cook and artist did not limit itself to watch-towers and tops of buildings, but succeeded in bringing prominently and distinctly forward whole peristyles and even figures in relief on pediments in a pure classical style. This self-taught sculptor on this miniature cabinet of his displayed a rare imagination and taste, seldom to be met with even among master-workmen who have been regularly taught. Notwithstanding the peasants' ingenuity in all kinds of woodwork, very few attempts are made at architectural decoration of their wooden izbas or cottages. The superior class of peasants sometimes border their roofs with open woodwork of an ornamental kind, like that to be seen on Swiss châlets, and some of them "go in" for pretty balconies.

Peter the Great, among other numerous industries, introduced at St. Petersburg the manufacture of Gobelins tapestry. It was successful under several of his successors, as far as execution was concerned, but, like many other Government establishments of the same kind, had to be closed owing to the ruinous cost of production. The carpet manufacture in Russia is but feebly developed. This, however, may be to a certain extent explained by the system of heating the rooms, owing to which carpets do not form a necessary requirement as they do in our country, for instance; they are looked upon more as an article of luxury. Besides, the fashion of oak parquet flooring, which, when polished, is in itself highly ornamental, precludes the necessity for carpets covering the whole room. A small square velvet-pile carpet with a pretty border, placed near the sofa under the table, in fact, is all that is required. These squares are generally manufactured in England specially for the Russian market. The upholstery business in Russia, like the furniture trade, does not go much further than imitation of foreign styles, chiefly French. In the production of furniture stuffs, however, Russia has made rapid strides, and we are informed that a Moscow firm exports several thousand pieces of furniture silks to England annually.

The manufacture of paper-hangings is also progressing in Russia; it is conducted principally at the capital of St. Petersburg, especially in the establishment of Mr. Camusé, celebrated for these productions, which are noted for elegance, variety, and novelty of design, the clearness and evenness of the printed colours, and, at the same time moderate prices. Particularly noticeable are the flock papers in two colours, embossed in gold, and also in imitation of leather, with figures in relief. It seems a pity that the Russian manufacturers do not avail themselves of the national art element, which is new and original. The Stroganoff School of Design, referred to above, has published numerous designs of this kind, which are of a very elegant and interesting description, and perfectly original. The more elaborate and expensive paper-hangings are imported from France; the duty is 4 roubles 50 copecs per pood = 1*l.* 17s. 3d. per cwt.

Taking a strict and impartial view of Russian industry in an artistic sense, we find that it is considerably below that of Western Europe in all objects which should exhibit originality, inventiveness, and beauty of form, and this is the direct result of the slow progress in Russia of art education in general, and as applied to manufactures in particular. Russian furniture, pottery, bronze, articles in silver and gold, even in the capitals, are executed from old models which have been learned by heart, for the reason that neither the master nor the artisan has seen better specimens, and both are unaware of the existence of the infinite variety in the forms of the best models and patterns of one and the same object. Several industries which flourished formerly in Russia, as, for instance, the production of articles in enamel, silver niello, and filagree work, are at the present moment, comparatively speaking, in a state of decadence. Even the pottery, encaustic tiles, &c., of the last century were more artistic and original than in the present day, and are now prized very highly by connoisseurs. Some manufacturers who import their models and patterns from abroad carefully hide them, permitting only a limited number of workmen to make use of them, and who are engaged under strict conditions of keeping the model a secret. More frequently than not the patterns of textile fabrics imported from abroad are mostly old designs gone out of fashion. The town of Tula, that great centre for the production of articles in metal, for a whole century has been engaged in copying the same designs, losing at each repetition something or other of their original type. The want of schools of design for the forming of artistic practical designers, and of technical museums with a proper collection of models in every branch of industry, which could be attended by the artisan classes,—these are the principal reasons of the backwardness of Russia in an artistic point of view. There are in all only three or four schools of design for the whole of Russia, and some three industrial museums. This is much regretted in Russia, as the Russian artisan under proper guidance exhibits extraordinary dexterity in every branch of industrial art. It will be seen, therefore, that in the production of the articles corresponding with those manufactured in Russia and exported to that country, England has nothing to fear, in spite of the increased duties which the Government, owing to a needy exchequer, is about to impose on all foreign productions. English china, faïence, encaustic tiles, glass, plated goods, bronze gasfittings, carpets, &c., owing to the artistic taste which is nowadays displayed in these productions, will always find a ready sale in Russia; for the educated classes, who are the chief consumers, are, as a rule, excellent judges of what is artistic and ornate. Besides, English goods there have a kind of traditional renown for solidity and durability far beyond those of any other nation in Europe.

THE ADVENT OF A PERIOD OF EARTHQUAKE,

AND ITS PROBABLE EFFECT ON THE BUILDINGS OF THIS COUNTRY.

No terror to which man is exposed is greater than that caused by earthquake. As a general rule, there is none that can be compared to it. Of the effects on the nervous system produced by a bombardment we cannot speak from experience, although there are now alive but too many who can. Of the consternation caused by a volcanic eruption, more especially when it commences by one sudden and violent explosion, as was the case with Vesuvius in 1860, and of that resulting from the discharge of a mine, or the explosion of a powder-magazine, experience is not uncommon. But in these cases, alarming as they unquestionably are, the very visibility of the danger after a time deadens its power to affect the mind. The risk is felt to be localised, and thus, it is hoped, to be avoidable. But such is not the case with earthquake. The bravest man, on being exposed to the first experience of this phenomenon, sudden and unexpected as its occurrence always is, will be impressed with a sense of solemn awe. And if shock succeeds shock, earth heaves like a ship at sea, crevices yawn in the soil, vast waves rush on the shore, and tower and spire totter and fall, little wonder that the frenzy of fear takes the form of temporary or even of permanent madness.

One great peculiarity of the earthquake is its recurrence in cycles, or after long intervals of rest. Many places where earthquakes are now unknown were formerly rent and shaken by oft-repeated shocks. This is the case with many districts in Great Britain, at so remote a period of time as to be remarked especially in strata that are older than the great North of England upheaval which is considered by D'Orbigny to have intervened between the deposit of the gritstones, or upper members of the carboniferous system, and that of the Peneen beds, or Lower New Red Sandstone. Among the Cambrian strata of Pembrokeshire are found many deposits of sandstone which promise, on first appearance, to yield excellent building stones, but which, on opening a quarry, prove to be so shaken throughout as to be quite unfit for architectural use. The same thing may be said of some of the porphyry and serpentine of Cornwall, noble and very beautiful stones, equal to marble, if they could be procured in large blocks, but shaken throughout. It may be questioned how far the lay and the strike of the great Welsh slatefield itself is not the result of action of the nature of earthquake.

In many parts of the world earthquakes are common. In Zante, for example, it has been said that they are of daily occurrence. It is in certain well-known zones, which for the most part are dotted with volcanoes, that earthquakes are now most common; and their energy is generally found to coincide with some change in the activity or the slumber of the volcano.

There seems evidence that, at all events in a certain district of Europe, a period of unusual seismic activity has recently commenced. What is most remarkable, and we may add most alarming, in the matter, is the wide area of country over which serious shocks have been felt. We have long been acquainted with local earthquake activity, but something much more than this has characterised the March and April of 1881. On the 26th of February the series commenced with violent shocks at Agram, in Hungary, repeated on the following day. That town (lat. 46° long. 16° about) is divided by the valley of the Save from the Carnic Alps, to which system, running in an easterly and south-easterly direction, the movement may be thought to belong. The Alpine upheaval is one of the latest in geological time. On the 28th a shock was felt at Kirschberg, in Austria, and on the same day in the district of the Puy de Dôme, in France, still on the same parallel of latitude, but at a distance of 13° of longitude, and divided from the upheaval district of the Alps by three successive upheavals, of which the lines of force run in a northerly instead of a westerly direction. On the 3rd of March shocks were felt at many places in Switzerland, again on another upheaval system. The shock extended to Alsace and the Black Forest, on the line of upheaval of Monte Viso. On the 4th of March occurred the destruction of Casa Micciola, in the island of Ischia, a spot supposed to be connected with the volcanic system of Vesuvius, Stromboli, and Ætna, and quite distinct from any of the formerly-mentioned centres of disturbance. And as we write, on the 14th of April, arrives the intelligence of a second and most destructive earthquake at Scio, overthrowing most of the buildings spared by the shocks of the 3rd inst. This island, which is an outlyer of Asia Minor, lies, we apprehend, on the line of upheaval of Tenarus, the last of those great elevations of mountain chains and large districts of country which have produced the actual physical conformation of the old world.

During the fifteen days from the 26th of February to the 12th of March, no fewer than nine distinct earthquakes have thus been recorded in Europe, composed of twenty-three distinct shocks. This, however, is nothing compared to the seismic activity of other parts of the globe. In 1856 there were 108 shocks in Honduras in a single week, and at Hawaii, in the Sandwich Islands, 2,000 shocks are said to have been counted in a month. But in Switzerland, where the subject of earthquakes is now carefully studied, the frequency of the phenomenon is said to be on the increase. In 1876 six shocks are known to have occurred; in 1877, five; in 1878, eight; in 1879, seven; in 1880, seventeen; and in ten weeks of 1881, eight. The last period of seismic activity in Switzerland commenced by a shock in the high Valais on July 1st, 1855, of such intensity that it was felt at Paris. Shock followed shock, though with decreasing intensity, for four months; but the movement did not finally cease until 1857, in the December of which year the centre of disturbance seems to have been shifted to Calabria.

The great earthquake of 1755, in which a portion of the quays of Lisbon covered with terrified inhabitants of the city, suddenly sank beneath the water of the Tagus to an unfathomable depth, was the latest great terror of the kind to which Englishmen were wont to refer in the first half of the nineteenth century. So profound was the impression created by this calamity (of which the results are visible in unrepaired ruins at Lisbon to the present day), that a foolish prediction that a shock would occur on the centenary of the earthquake of Lisbon sent numbers of the inhabitants of London from their dwellings on the night in question. The alarm was very great, of course chiefly among the most ignorant.

Perhaps the first thing that deserves to be called study of the phenomena of earthquake is to be referred to the effects of the Calabrian earthquake of December, 1857, by which as many as 30,000 people were said to have been killed or injured, chiefly in the province of Basilicata. An expedition was sent by the Royal Society into the interior of the kingdom of Naples to investigate the circumstances of this earthquake. The report, by R. Mallet, was published in 1862, in two volumes, illustrated with plates, maps, and cuts, and the work developes the first principles of observational seismology. The same author published, at Dublin in 1854, a "Notice of the British Earthquake of Nov. 9, 1852," and an account of experiments made at Holyhead upon the transit velocity of earthquake waves through rock formations.

In Italy, subject as it is to earthquake, the study of the phenomena has been carried to a high degree of precision. An observatory has been established on the flank of Mount Vesuvius for the purpose of watching the indications of threatened eruption from the mountain, which are usually accompanied by local earthquakes. This observatory has long been presided over by Professor Palmieri, who (as we believe) was the inventor of the seismometer, seismoscope, and seismograph, instruments for measuring and recording the force, duration, and direction of earthquake waves. In these instruments the agitation or change of level of a mercurial column sets to work a delicate electric apparatus, which records the time of the first shock, the intervals between the shocks, the duration of each, their nature, whether vertical or horizontal, the maximum intensity, and, in the case of horizontal shocks, the direction in azimuth. These instruments are sufficiently sensitive to be affected by any violent shocks occurring in the Mediterranean basin. On the occasion of an eruption in the Greek archipelago, Professor Palmieri announced the occurrence of a great disturbance long before the news reached Naples. Shocks occasioned by disturbance of Mount Ætna are readily observable by the seismometer on Vesuvius. We have not heard how far observations have been made at the dates of the Hungarian, Swiss, Italian, and Ischian earthquakes of the present year, or, at that of the terrible catastrophe at Scio.

The point which seems to us at this present moment to be most deserving of attention in this country is the indication of either the deeply-seated, or the widely-spread, cause of activity of which we have had such disastrous proofs. It is probable that the seventeen distinct lines of upheaval which have been referred by D'Orbigny to geological date form but a small portion of the natural seismographic records which may hereafter be discovered impressed on the surface of the globe. But in the meantime, it is instructive to refer, both to these lines of direction, and to their comparative dates, as evinced by the unconformability of the strata deposited before and after their occurrence. The upheaval of Tenarus, the last of these great movements, is indicated as having occurred since the deposit of the modern alluvium. The upheaval of the Côte d'Or, in the direction W. 40° S., is the eleventh of the series of D'Orbigny, and separates the deposit of strata contemporary with our Purbeck beds, from that of the upper member of the oolite, the Portland stone. Intermediate between these two disturbances lie upwards of 4,000 ft. of strata, grouped in twenty-six different beds. The Wealden, with its monstrous reptiles, the greensand, and the enormous system of the chalk, are all later in formation than the upheaval of the Côte d'Or; the upheaval of Monte Viso being intermediate between the upper greensand and the lower chalk. Thus a group of disturbances ranging from Auvergne, the Black Forest, and the Great St. Bernard, to Foligno, Perugia, Ischia, and the shore of Asia Minor, shows a connexion with centres of geological action of enormous activity; and the phenomena demand a special study with regard to their geological relations.

As to this, the neglected aspect of the city of Lisbon affords a lesson which may carry much information. We should conclude that the valley of the Tagus was of or about the date of the upheaval of the Pyrenees, which marked, according to D'Orbigny, the close of the chalk period. Lisbon itself stands on four distinct geological formations. These are basalt, limestone, sand, and what are called the Almada beds, thin strata of clay intermixed with sand. In the earthquake of 1755 nothing that stood on the two more ancient strata was seriously injured. The great Alcantara aqueduct, which crosses the valley to the north-west of Lisbon, was completed by the Marquis de Pombal in the very year of the earthquake. It is 225 ft. high over the deepest part of the valley. It consists of thirty-two arches, ranging from 50 ft. to 100 ft. in span, and is very narrow. It was uninjured by the earthquake, though it is said to have been seen to rock, and one coping or cornice stone was said to have been thrown down. The church of St. Gioachimo, at Belem, on the sand, was injured. But every building reared on the Almada beds was thrown down. To this hour (unless recent and unmentioned improvements have been effected) the visitors to Lisbon may trace the surface geology of the city by the lines of ruin effected by the earthquake of 1755.

The question arises, was it to the different conducting power of the different strata, as regards the seismic waves, that the difference of safety is attributable, or was it to the depth or internal position of the centre of disturbance, and its relation to the upper portions of the different strata, that it is to be ascribed? The question is, we think, virgin. It is one of no small importance. And as relates to the possible return of earthquake activity in Europe, it is a question of primary importance as relating to the safety of the buildings of Great Britain. London, in any case, would fare ill in case of earthquake. The houses are not raised with any view of resisting such shocks, and the alluvium of the Thames valley would probably suffer much as did the almada beds of the valley of the Tagus.

We hardly yet can be said to have framed any intelligible theory of earthquakes. That there is an actual movement of the surface of the earth there is no doubt. The writer, in the great Neapolitan earthquake of 1857, had to hold on to an iron railing, in order to keep his feet; while the terrace on to which he had stepped, in order to look at the volcano and see whether it was in eruption, rocked beneath his feet just like a ship at sea; and in this same earthquake,—some thirty shocks occurring in the same night,—the whole circuit of the Bay of Naples was raised 8 in. above its former level. But the shock felt was far more intense than that due to any observed movement. It is rather of the nature of the shock produced in the secondary circuit of the battery. In fact, as far as the nervous system can be depended on as a judge of the nature of shock, the effect of the two phenomena is identical. Thus the question of the conductivity of strata becomes one of very serious importance. What we want to know, in order to form any anticipation of the effect of greater activity in the internal force of the earth on the buildings of this country, is, first, How do different strata comport themselves under given shocks? and secondly, How far is such difference due to the position of the centres of disturbance, and how far to the conductivity of the stratum?*

"THE TWENTY STYLES OF ARCHITECTURE."

UNDER this absurd title is published, by Messrs. Sampson Low & Co., a book which is but too typical a specimen of the kind of popular writing on architecture which is put forth in this country. It bears no author's name, but is by the editor of a book entitled "The Hundred Greatest Men,"—so the title-page informs us. We never saw the latter work, but we presume it is of the same type as the one before us. As it was necessary, in order to make a catching title, that there should be just a hundred "greatest men," so it is necessary in the case of the present work that there should be just twenty styles of architecture. The classification is such as might be expected under such a title. Under the head of "Revived Classic" we find "Florentine," "Roman," "Venetian," and "Parisian," which last is further defined in brackets as "Jesuit" or "Ultra-Classic" (!), whatever the last term may mean. The place of poor France in Renaissance architecture is thus reduced to the production of the worst form of rococo, which this wise editor calls "Ultra-Classic"; this in the general classification of styles, at least, though we observe there is some hint as to the existence of an early French Renaissance style in another part of the book. Under the head "Classic" are grouped "Latin" and "Byzantine"; the former we might suppose meant Romanesque, only we find Romanesque under a separate heading. The Latin and Byzantine styles, we are told in a foot-note, extend far into the Middle Ages, "and degenerate into Mediæval Latin and Mediæval Byzantine." That is, at any rate, a novel way of putting it.

The detailed criticism in the book is in keeping with the general idea of it. "Take the Karnac capital and cut away nine-tenths of it from the top, the remainder will be Greek Doric." Of the existence of columns in Egypt giving the Doric column in the rough, in a very different way from this suggestion, the writer does not seem to be aware. The cornice from the porch of the Erechtheum, given as an example of Ionic, has "a cyma ornamented with eggs." The writer has apparently been led away by the common phrase "egg-and-tongue" ornament into this absurd idea of a Greek architect ornamenting a cornice "with eggs." But the whole book is full of evidence of the writer's ignorance of the very meaning of the terms he uses. The discrimination between the Greek and Roman column is a curiosity of critical appreciation. He explains that "the Greek shaft is fluted, the Roman is plain" (we presume he never saw that peculiarly Roman specimen known as "Jupiter Stator"), and gives the reason thus:—"A column of plain stone of many blocks must be fluted, and should have its entasis below the centre; a monolith of precious stone in a setting of metal or marble should be smooth or without flutes, and has its entasis in the centre." And why *must* it? We do not suppose the writer has the slightest idea; he gives no evidence that he has. There is a very good reason (an æsthetic reason) for the fluting of columns, but we do not imagine the writer knows what it is. We are not going to help him to it, but we can assure him that it has nothing to do with their being jointed or otherwise. He goes on to say, "These are the two types of antique columns, the Parthenon and the Pantheon: both are equally admirable." If he thinks so, he has not begun to understand the refinements of design of the Parthenon. But the author's notion of the æsthetics of architecture may be estimated from the fact that he selects the Roman use of the cubical slice of entablature over the column as a special beauty. This sentence is so charming a specimen of the high-flown nonsense which is characteristic of "popular" writing on architecture that it would be a pity not to quote it whole:—"The square fragment of entablature is certainly a feature of great beauty. Architects are forbidden to imitate it or admire it, because it is the final term, decadence, or signal of fall. Naturalists may be permitted to do so, having traced its formation and growth, first as a single beam, then two, then three, these being imitated in stone, gradually transforming their proportions until the cornice, which was smallest, becomes largest, and sets off the rest as a crown does a royal head. All that remains to be added is, that precisely on account of its supreme beauty, it should not be reproduced or imitated. What we are to do, of course, is not to imitate a Classic, but take up some Gothic waif of our own and train it up till it reaches a Classic standard."

This is the sort of stuff which is put forth in this country to teach the public architecture. It would be waste of time to comment on it; but it certainly may be asked, Why do not publishers of standing and respectability, when they mean to bring out a book on a subject of this kind, take some steps to ascertain that the person who does it is competent to deal with the subject? Of the ridiculous nonsense which is written about Gothic architecture (which commences with a plate of Notre Dame described as "Parisian Gothic"), the entire ignorance of its constructive and formative causes, it is not worth while to speak. People who know anything whatever about architecture would simply lay the book down again with a laugh; people who are so ill-informed and foolish as to accept such teaching would probably not understand the grounds of our criticism, and we could not occupy the pages of the *Builder* with refuting such obvious fallacies. We can only express our regret that publishers should be so careless in putting forth works on subjects of this kind by people who are quite incompetent to treat them, and thus helping to mislead the public, who are ignorant enough on the subject already.

Carnarvon Castle.—The renovation of this fine ruin is being carried out under the personal supervision of Sir Llewelyn Turner, the deputy-constable, and the ancient fortress is being placed in a condition to withstand the ravages of time and weather. The outer walls have been divested of the vast quantity of self-sown roots which well-nigh concealed them from view, and the joints have been pointed and cemented. The stone staircase of the turret attached to the Queen's Tower has been completed to its full height of 80 ft.; the tower at the south-east end of the castle ditch and its ascending turret, which had been inaccessible for ages, have been thoroughly repaired, and the beautiful old chimney-pieces entirely renewed.

REPORT TO THE BOARD OF TRADE ON THE SOLWAY VIADUCT COLLAPSE.

THE report of Major Marindin to the Board of Trade on the collapse of the Solway Viaduct is very fully in harmony with the remarks made in the columns of the *Builder* on the occasion of that catastrophe. The report states the leading dimensions of the bridge, and the date when it was opened for traffic; the total length being 1,940 yards, comprising 192 spans of 30 ft. each. The bridge was opened in 1870, and in the winter of 1875-6, thirty-three columns were found to be cracked, "evidently from the freezing of the water with which they they filled." If this be accurate, it reveals a new and wholly unnecessary source of danger, to which the bridge was left exposed. These columns were replaced, and no fresh danger was observed until the January of the present year. On the 19th of that month a pier was discovered to be cracked. On the 30th piers Nos. 64, 65, 70, and 73 fell; and by the 2nd of February, twenty-nine more piers were down, with all the girders which they bore. The floating blocks of ice struck and snapped column after column, a fact which is by no means surprising, when we consider that the columns in question were, in fact, 12 in. pipes of cast iron, seven-eighths of an inch in thickness; while the height from low water to the level of the rails was 36 ft. The only wonder is, that the bridge would have escaped destruction from a cause which the old bridge-builders well knew to be so fraught with danger, for ten years.

"This disaster," remarks Major Marindin, "furnishes a very convincing proof of the unreliability of small cast-iron columns when used for the piers of viaducts in positions where they are likely to be subjected to any blow or sudden shock; and as it was proved by the fate of the Tay Bridge that they are equally unreliable in cases where they are exposed to heavy transverse strains from wind pressure, it must be evident that, whether for high viaducts exposed to wind, or for viaducts across estuaries in this climate, where they are exposed to sudden changes of temperature, and to blows from floating ice, it would be far better in future to avoid any such mode of construction." In the Tay Bridge, our readers will remember, it was to the want of anchor bolts, rather than to the use of columns, that the absence of strength to resist the force of the wind was due. And as to climate, the shock caused by floating wreck might be as fatal as that caused by ice. But with the recommendation of the inspector we so fully agree, that we are at a loss why he goes on to say, "I do not, however, consider that the reconstruction of this viaduct need be objected to, provided due care is taken, either by the erection of timber ice fenders, or by the substitution of wrought-iron rakers of sufficient strength to withstand the shock of the blows of the floating ice, to guard the cast-iron bearing columns from any such danger."

Either 12 in. columns, guarded by wooden dolphins, or some other contrivance, are permanently safe, or they are not. If not, we agree that "it would be far better in future to avoid any such mode," not only of construction, but of reconstruction. But if they are safe in a case which forms so extended an ice-trap as the viaduct over the Solway, in what possible situation can it be better "to avoid any such mode of construction"? No doubt, as the reporter says, "it is worthy of consideration whether it would not be better to increase the width of the spans at the centre of the channel, so as to permit the ice to pass more freely than it does at present." No doubt, also, we should add, it will be worth consideration whether it is not better to substitute masonry piers for 12-in. columns, which have on different occasions proved quite inadequate to perform the functions of piers.

Economy in building is a great virtue. But it must be a true economy. We have always had a strong feeling that the use of small iron columns, even if clustered more thickly than in the case of these estuary viaducts, to form the piers of railway bridges, was undesirable. It is supported only on the ground of economy. In the cases cited, this has been known to be a sadly false estimate. We regret that there should be any disposition shown to take off the edge of the very serious lessons which have been read to our engineers by the storms and floods of the Tay and of the Solway. We think that the use of so inadequate a form of pier should be at once and distinctly prohibited.

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* Since the above was in print, another severe shock of earthquake, lasting four seconds, was felt at Scio, at 11.30 p.m., on the 19th current, at an interval of eight days from the shock of the 11th, as *that* was at an interval of eight days from the shock of the 3rd.

FROM THE BANKS OF THE SEINE.

The impression exists, and certainly not without some foundation, that Paris affords people of taste a wider field for the exercise of their love of culture than is afforded by any other modern city. Whether this impression be correct or not, it is a question as to which there are not a few who express openly their reasons for doubt, and certainly those whose tastes have been formed in Paris alone are likely, and, indeed, certain, to be too thoroughly Parisian to satisfy people of broader views, whose minds have been cultivated to appreciate something better than the learning of the boulevards or the art, skilful as it is, of the Rue Bonaparte and the Quartier Latin. Paris certainly offers to the stranger, on the easiest possible terms, an opportunity for the study of the beautiful more easily than London, owing, not so much to our deficiency of material, as to the largeness of our capital, and perhaps even to the very wealth of our treasures. There exists, undoubtedly, in Paris a more exact organisation of all studies, and the student, be he young or old, more readily finds in Paris the nearest approach to a direct road than in any other city in Europe.

For the ordinary visitor in Paris, the mere seeker for cultivated pleasure, and there are many who still visit Paris with such an aim, not a week passes that his attention will not be called to some fresh delight, some newly-revived memory of the beautiful work of the past, or of new work just created, the result of the careful study of former teaching. Within a few days there have been more than one of these opportunities. At the École des Beaux Arts an unusual interest has been taken by the visitors to that ever instructive institution on the Quai Voltaire, where above whatever new is exhibited, we may see day by day the admirable copies from so many of the greatest works of the early Italian masters, and where we can instruct and direct our memory so easily and so pleasantly by recalling the originals and the extraordinary difference that exists between them and the copies. Just at present are being exhibited the competitive designs and models for the great monument which the French Government has determined to erect at Versailles in commemoration of the historical Constituent Assembly held there in 1789, and which promises to be without doubt the greatest monumental effort of modern days. It was only last year that the French Government determined on erecting an enormous monument on the Place de la République, and to which reference has been made in these columns. Since then, although M. Dalou was not the successful competitor, his design was so highly appreciated by the French critics and others, that the Paris municipality very wisely purchased the magnificent model, of which we remember we expressed in warm terms our admiration a little more than a year ago. Again, this year M. Dalou has been unsuccessful in being selected to execute the great Versailles monument, which has fallen into the hands of two artists more fortunate, but scarcely more skilful; and, again, M. Dalou has been complimented by the State purchasing his magnificent bas-relief, which they propose to place in a conspicuous position above the president's chair in the Chamber of Deputies. The accepted model is more complete than any we have yet seen, on the ground of the thorough manner in which the model is presented. The actual height of the model is some 12 ft., covering a table of nearly 12 ft. square, and so thoroughly is the design carried out that the smallest details are perfectly executed, and the more important reproduced on a still larger scale, accompanied by drawings and plans from the hands of the architect (M. Formigé), so that we see the perfectly harmonious association of the architect, the sculptor, and the painter; for the architectural drawings are so perfectly coloured that the architect who executed them may certainly claim a sufficient knowledge of colour to call himself, if he pleases, a painter.

At the sale of the effects of the eminent etcher Jules Jacquemart, last week, we had a special opportunity of reviving our admiration for the lovely work of Seymour-Haden, whose etchings there can be no doubt deserve to take a place in our affections in immediate association with our memory of the most beautiful objects in existence. There never has been printed from copper or painted on panel any landscape that can exceed in beauty some of Seymour-Haden's etchings; but in order to justify admiration as high as this, we must judge of him by the sight of impressions selected by himself, perhaps printed by his own skilful surgeon hand, and written on with friendly words to a beloved master. Such were the impressions at Jacquemart's sale, not many, and they were, as they deserved, highly estimated by a few eager purchasers. In looking at such impressions, where the exquisite gradations of colour and tone are so completely preserved, from the strongest power of the aqua-fortis to the tender touch almost of the dry point, we feel that Seymour-Haden is not only the greatest landscapist on copper, but that he has been gifted with a power to perfect the manner of representing with the needle effects which his great master Rembrandt merely suggested. Costly as these really precious impressions are, the time will surely come when Seymour-Haden's "Combe-Bottom" and some of his Kensington Gardens etchings will be as highly or even more highly prized, because even more rare, than the finest etchings by Rembrandt or the most curious scrap of Baccio Baldini, Botticelli, or a *niello* by Finiguerra or Francia, because these latter can almost perfectly be reproduced by photographic processes, whereas the exquisite work of Haden's hand and mind must suffer greatly, even by the most careful methods of reproduction.

No greater contrast could be easily devised than that afforded this week by the exhibition of etchings at Jacquemart's sale, and the display of water-colour drawings at the rooms of the "Société des Aquarellistes," where the hasty mercenary works of the few members of this now feeble society are this year so weak and common-place that not even the Parisians and their complacent art-critics will be able to praise the work of their amiable but too-confiding artistic friends. Last year,—the second only, we think, of this society,—fulfilled a high promise so completely, that very little was left us to desire from the graceful hands and tender thought of these artists, but, for reasons not difficult to determine, this year all the grace and all the delicate thought appear to have given place to a miserable love of gain and to the cynical and unbecoming indifference to all criticism or choice beyond or outside the circle of the dealers' skilful management of the monstrous market value of certain artists' drawings.

ART IN WHITECHAPEL.

On Thursday, the 14th, an interesting loan exhibition of works of art was opened in the schools attached to St. Jude's Church, Commercial-street, Whitechapel. The accomplishment of such an exhibition is mainly due to the energy of the vicar, the Rev. S. A. Barnett, assisted by a committee partly composed of residents in the district and partly of volunteers from the West End. The exhibition was opened formally by Lord Rosebery, who, at a crowded meeting in one of the schoolrooms, delivered a short and very appropriate address, dwelling on the desirability of providing the working population with opportunities of occasionally making acquaintance with works of art in an easily accessible position in their midst, instead of necessitating the rather long excursion to South Kensington and other westerly collections of art. He observed also that an exhibition got up in the manner and in the spirit of this one was an admirable instance of the way in which art brought together people of different social classes and dwelling in different parts of London, on a footing of common interest. Mr. Barnett, in some preliminary remarks, commented on the fact that the exhibition was to be open during Good Friday and Easter Sunday, explaining that he had not advocated this course, which he knew some would take exception to, from any idea that art could be put in the place of religion, but that he firmly believed that the awakening of an interest in any intellectual pursuit was at least an ally of religion, and that truths of art tended to lead the way to the contemplation of still higher and more vital truths.

The exhibition, which filled three large rooms in the school-buildings, included a considerable variety of objects, — pictures, needlework, pottery, &c., and they were very well arranged, classified, and labelled with brief descriptive notices. Among the pictures was Mr. Watts's great work, "Death and Time," along with several others of his paintings, which had been lent by or at the instance of the artist, who has taken great interest in the matter. A good many of Sir F. Leighton's minor works were there, and some of the best of the works by Mr. Burne Jones which were in the recent collection of decorative painting in the East Room of the Grosvenor Gallery. It may be doubted, perhaps, whether these latter were the best class of works to interest an East-end concourse in pictorial art, though they are remarkable and typical paintings in their way. We should have thought it more to the point to have had a larger proportion of works illustrating subjects which "come home to the business and bosoms" of the people, and have some bearing on their own daily life and experience. This element was not unrepresented; one very good specimen of it, indeed, was to be seen,—Mr. F. W. Lawson's painting, "Her Father's House," which was in the last Academy exhibition; but this class of pictures was not very prominent. Very likely the promoters of the exhibition would reply that they would have been glad to have had more such pictures, but that they had to take what was lent to them. In decorative art there was a great deal that was interesting. The collection of textiles was very good, partly lent from South Kensington and partly by private owners; and there was a considerable collection of pottery in various styles.

One suggestion that was made in Lord Rosebery's speech is worth emphasising; that the idea of turning board and parochial schools to such a purpose, during the time when the buildings are not wanted for tuition, is a very good one, and might very well be repeated in other localities. We hope it may. It is only another kind of teaching, and school buildings could hardly be put to a better use, when circumstances admit of it.

The exhibition has been open, during the present week, up to Friday evening.

NEW CHURCHES AROUND EDINBURGH.

Notwithstanding the recent depression of trade and consequent deterrent influences upon building operations, remarkable activity has been displayed in the city by different denominations in the erection of new churches. These churches have mostly been built in the suburbs, consequent upon the extension of the city in all directions. In referring to them it is necessary to take a mental circuit of the city, in doing which we shall take the suburb of Morningside, to the south-west, as our starting-point, proceeding northward.

At the angle of Chamberlain-road and the public highway we find a large and striking United Presbyterian church approaching completion. It is designed by Mr. Daniel Robertson, architect, and is intended for the congregation which at present is in possession of a church immediately adjoining, which was built about fifteen years ago, at a cost of 2,200*l*., and is now found insufficient as regards accommodation. The new church will cost upwards of 10,000*l*., and presents a marked contrast to the old one, which is a superficial structure of nondescript Gothic character. The style adopted is the Norman of the twelfth century. The church stands north and south, and a massive tower at the north-west angle rises to a height of 110 ft. Accommodation is provided for a congregation of 1,000, which will be seated in the body of the nave, and in a gallery at the north end, the aisles being used, in the mean time, merely as passages. To the south a commodious hall stretches diagonally, and there is the usual accommodation of vestry, session-room, &c. The clearstory contains three-light windows, provided with inner detached shafts, which, with the solid pillars and moulded arches of the aisles, impart an air of substantiality to the interior not usually found in the churches of this sect. The roof is of timber, with semicircular principals, boarded in between. Behind the pulpit is a recess for the organ and choir. While adhering to the usual twelfth-century detail, Mr. Robertson has declined to introduce grotesques, which formed a characteristic of the buildings of the period. The church is seen to advantage especially as approached from the west by the Colinton-road.

In an excessively steep and narrow lane, leading from the Grassmarket to Lauriston, called the Vennel, stands a United Presbyterian church, mean and badly ventilated, erected at a time when that body eschewed with fixed purpose the æsthetical element. The congregation here meeting recently resolved to erect a new place of worship, and secured a vacant site considerably to the eastward, at Gilmore-place, and upon this site there has been erected a new church, at a cost of 3,500*l.*, from the designs of Messrs. Shiells & Thomson, architects. The church takes the form of a nave and transepts, with vestry, &c., in the rear. The sum at command rendered a tower or spire inadmissible, but a *flèche* has been used to break the sky-line. The interior is fitted up with galleries on three sides, and the roof is of open timber, supported entirely from the walls. The church accommodates 850 persons.

Within a stone's throw of this new church a site has been secured for the congregation of the same (U. P.) denomination who meet in Bread-street. A sum of 6,000*l.* is to be spent on the new church; accommodation to be provided for 1,000 persons. The design has been thrown open to competition, but no premiums are offered. The site secured is a good one for architectural effect, but the space is somewhat limited for the requirements, and the competing architects will consequently find the problem submitted to them one not the most easy of solution.

In the western suburb of Dalry a new Free Church is in course of erection from the designs of Mr. Raeburn, architect, and is about ready for roofing in. The building takes the form of a parallelogram, 94 ft. long by 45 ft. broad. At the left-hand angle a spire rises to the height of 124 ft., and the gable is divided into three compartments by a buttress with gabled pinnacle, and a similar buttress is placed at the right angle. The doorway is moulded and ornamented with the ball-flower, dog-tooth, and quatrefoil, inserted sparsely at distances of about a foot. Above there is a four-light window with tracery. The side elevation is divided into five bays by buttresses, and the windows are wide, without tracery or mullions, but have moulded cusps, producing the impression that a central mullion and tracery have been removed. The area is divided into aisles by iron pillars, and the roof is of open timber. Accommodation is for 800; cost about 5,000*l.*

The tower of Free St. George's, Shandwick-place, is making satisfactory progress. So far as built, it consists of a mass of unpierced masonry, upon the ultimate effect of which it would be premature to hazard an opinion.

Passing onwards to the north-east, we find a new crescent in course of erection, immediately to the west of the village of Cannon Mills, and on the ground in front thereof stands a new church, which has just been occupied, but which is incomplete as regards the spire and other adjuncts. This church, which is of a very ornate description, is intended for a congregation of United Presbyterians, who have for some time met in the Queen-street Hall, and the erection of it was stimulated by a gift of 3,000*l.* from one of the members. The architect, Mr. Starforth, has adopted the Early Geometrical style, and has given dignity to his conception by the largeness of the parts. The church proper consists of a parallelogram, 72 ft. by 46 ft., with a vestibule, 30 ft. by 12 ft., and there is a vestry, and preparations for the erection of a hall, &c. Accommodation is provided for a congregation of 700, of whom 150 find places in a gallery over the vestibule. The sides are divided into five bays by buttresses running up to a deeply-moulded corbel-table, and in each bay there is a three-light window, about 16 ft. high, the tracery in these windows being varied. The principal front is somewhat florid, the doorway having shafts with carved caps and deeply-cut mouldings; on either side are dwarf buttresses with enriched canopies, and the gablet over the doorway is crocketed, and terminates in a rich finial. In the gable above are three windows, the central one of three lights, and those on each side of two lights, the piers between being deeply moulded. Above these three windows there is in the upper part of the gable a five-light window. The staircase to the gallery is marked by a gabled roof, having a spirelet attached, which rises to a height of 60 ft. The tower to the left is only finished to the height of 50 ft., but when it is crowned by the spire, it will form a marked feature in the neighbourhood, being characterised by specialties in the design. The gable at the pulpit end is pierced by three two-light windows, with traceried heads, above which is a moulded panel. The ceiling is open-timbered, lined between the rafters, the principals springing from carved stone corbels. The vestibule ceiling is groined, the moulded ribs springing from corbelled shafts, and at the intersection of the ribs are foliated bosses. The pulpit and interior woodwork are of selected pitch-pine.

The new German church close by, with no features in anywise of a German character, is now in use, and with its pigmy spire, &c., is unsatisfactory.

To the north-east, on the grounds belonging to Heriot's Hospital, situated between Leith-walk and Junction-road, a new suburb has sprung up, mainly inhabited by the working classes, the houses being uninteresting and commonplace as regards exterior, but apparently solid, substantial, and suitable. Here, at Colston-street, a new church, for the United Presbyterian body, is to be erected, the design for which was the subject of a limited competition. The design of Mr. Andrew Dewar (semicircular on plan) was chosen. It is doubtful whether the design, in its entirety, can be carried out for the stipulated sum of 3,500*l.*, the accommodation required being for a congregation of 800.

On the Junction-road we came upon a new Episcopal chapel,—small, neat, simple, and appropriate,—which we learn was designed by Mr. H. J. Blanc, architect. Strolling onwards, we pass the ancient Palace of Holyrood, and enter the Queen's Park, and looking westward we see, cropping up from the mass of buildings recently erected on the sloping ground at Dumbydykes, the steep roof a church and spire. This is for a congregation adhering to the Establishment, and was designed by Messrs. Shiells & Thomson, architects. It is situated in a very steep and rather narrow street, and a somewhat striking effect is produced by the high-pitched and narrow gable pierced by an elongated three-light window; otherwise the exterior is commonplace enough. The basement is occupied by a commodious hall, vestry, &c., and the entrance to the church is from the higher level of a cross street. The interior presents an unobstructed area, having galleries on three sides and semicircular apse, in which are to be placed the pulpit and organ. The roof is of open timber, boarded between the principals, and is 50 ft. high at the apex. Accommodation is provided for 900 persons, and the cost is about 5,000*l.* Close by, in St. John's-street, Canongate, operations have been commenced for the erection of a church in connexion with the Old Church Parish. The church is to accommodate 875 persons, of whom 340 find seats in the galleries. The estimated cost is 4,000*l.*, and the architects, Messrs. Anderson & Browne, state that they have endeavoured to make as much as possible of simple constructive necessities, and to rely for effect upon the picturesque grouping of the mass, elaboration of detail being unattainable. The body of the church is T-shaped, the extremity of the long-arm being octagonal, and at the angled sides are circular stairs leading to the galleries, and a porch and vestibule, which form the principal entrance. The nave is covered in by a hammer-beam roof in one span, and is ceiled in with narrow boarding at the level of collars. The roof of the transepts is double, the ceiling being boarded. Completing the cruciform plan, there is a recess, in front of which is placed the pulpit, behind which is a gallery for choir and organ, with vestry, &c., beneath. The walls are to be of square snecked rubble, with scabbled dressings, and the roof is to be covered with plain red tiles.

In Jeffrey-street and at the foot of Carrubbers-close, a new Episcopal church has been for some time in progress, and is now ready for the roof. It is designed by Messrs. Hay & Henderson, architects, in the Early English style. The ultimate cost of the church will be about 3,000*l.*, and accommodation is provided for a congregation of 500. Considering the means and requirements, the architects have produced a very satisfactory result. With the view of giving sufficient height to the elevation, amidst the lofty buildings beside it, and utilising the limited space at command; the vestries, &c., are placed upon the ground level, and the church above them. The chancel is placed towards the street, and is lighted at the end by three elongated lancets with moulded piers. On either side are aisles of two bays, which are lighted by small lancets, and the clearstory by trefoils under pointed arches. There are no aisles to the nave, which is 90 ft. long by 40 ft. broad, and it is lighted by simple splayed lancets divided by buttresses. The side elevation will not be much seen when the street is completed. Over the chancel arch is placed a bell-cot with three arched openings. The caps of the pillars in the church are carved, and the roofs are of open timber.

COLLIERY ACCIDENTS, AND THEIR CAUSES.

BY the great public attention roused and directed to colliery accidents through explosions, such as that at Seaham Harbour, a false impression is caused in the minds of the public in regard to the loss of life in and about the coal-mines. The popular impression is that the explosions, such as from time to time shock the public mind, are the most fatal of the causes of loss of life in coal-mines; but this is not the case, as may be shown from the official returns of the inspectors of mines. It may be stated that for some time we have been deriving the benefits from the Acts on the Inspection of Coal Mines, in addition to direct methods, by the more accurate records that are now obtainable in regard to the extent of the loss of life in mines and the causes; and the official documents to which reference has been made enable us to say with some accuracy to what the loss of life is traceable. At the present time it may be of interest to trace this a little in detail, so as to show which of the great causes of colliery accidents is the most fatal. The knowledge of this would do much to remove some of the erroneous suppositions that are made, and would enable the mind to be more readily directed to any possible remedy. It is evident that for this purpose it would be misleading to take the returns for one year, and that, the further the inquiries can be extended back, the more reliable would be the conclusions that may be drawn therefrom. The returns of the inspectors of mines for the present year furnish tables that extend over nearly thirty years, and dividing these into two decades, and adding those for the incomplete decade, it may be said that we shall obtain a mass of fact which will be well worth consideration. We may premise that the tables give both the number of accidents by which lives were lost, and also the number of lives lost in each year, and it is evident that the latter is the table which will be the most useful for the purpose named.

It may be added that the chief causes of accidents in and about mines are thus classified,—fire-damp explosions, "roof and sides falling," accidents in shafts, miscellaneous underground, and miscellaneous on surface. Taking the first and second classes, we give the following as a summary of the teachings of the elaborate tables given by the chief inspector. The number of deaths in the three periods were as under:—

Years.	Fire-damp Explosions.	Roof and Sides falling.
1851 to 1860	2,441	3,767
1861 to 1870	2,267	4,163
1871 to 1879	2,187	4,046
	6,895	11,976

It is clearly shown, then, by this table, that heavy as was the loss of life by fire-damp explosions in the coal-mines of the kingdom, the loss of life from falls of roof and sides in the mines far exceeded that heavy loss. And whilst the loss of life from fire-damp explosions has been decreasing during the twenty-nine years covered by the comparison, the reverse is the fact in relation to the more frequent, if singly, smaller accidents. And it may be further said that whilst the loss from these heavy explosions is irregular, and distributed in different degrees in various years amongst the chief coal-mining districts of the country, yet the loss of life by roofs and sides falling is constant and general. For instance, last year, there was only one life lost by explosions of fire-damp in Northumberland, Cumberland, and Durham; this year there will be over 160, and it is possible that districts that were heavy sufferers last year may this year be free. But last year, whilst the three counties named were free from that heavy loss of life from fire-damp which has been this year broken in on, they had to record a loss of not less than fifty-one lives from falls in the pits. This constant loss of life is not brought so strikingly to the notice as that of the other, and hence it is overlooked.

Turning now to the other heads, we give the table in the same way, for the same period of twenty-nine years. From the causes named the loss of life at and about the mines was as under:—

Years.	In Shafts.	Miscellaneous Underground.	On Surface.
1851 to 1860	2,119	1,186	505
1861 to 1870	1,505	1,916	776
1871 to 1879	1,264	1,724	810
Totals	4,888	4,826	2,099

It thus appears that there were 4,888 lives lost by accidents in the shafts of the mines, and that the loss of life from this cause has decreased of recent years,—a decrease contributed to by the use of "detaching hooks," by which over-winding and other cage accidents have been almost minimised. But the number of miscellaneous underground accidents has increased in these years,—swollen as it now is by many fatalities with trams and tubs and on inclined planes. The accidents on the surface have also increased during the last twenty-nine years, and no very special cause can be assigned for this increase. If now we take these totals and give the numbess for the decades, we shall have the following as the loss of life from accidents in and about our coal-mines:—

Years.	Lives Lost.
1851 to 1860	10,018
1861 to 1870	10,626
1871 to 1879	10,031
	30,675

It is a fearful loss of life, and at first sight it seems that it is in each decade growing worse. But it must be borne in mind that the truest test is that of the proportion that that loss of life bears to the coal produced and to the number of persons employed. More than double the number of persons are now employed about and in old coal-mines that there were thirty years ago, and hence, though the number of lives lost is slightly more than it was, there is an increase in the comparative safety of the miners, and to a very large extent. And in regard to the coal extracted for every life lost, there is the same testimony, the only important detailed losses in which the contrary is the case being those incurred by miscellaneous underground and surface causes. It is well, therefore, to bear these facts in mind, for it is evident that a localisation of the causes of the accident is needful to insure any preventive. What legislation may be needed it is not now desirable to state; but it may at least be pointed out that whatever might be done which could be done to check the serious loss of life from fatalities such as that at Seaham, yet it is clear that there needs the intelligent increase of supervision below, not only on the part of the employer, but on that especially of the miner. It might be that scientific research and additional legislative enactments might do something to lessen the loss of life from heavy fatalities; but it needs constant effort and general care to reduce that smaller but ever running stream of fatality which bears away the chief part of our mining population that falls year by year out of the ranks of the workers, and passes on the stream of accident into the Silent Land.

PROJECTED SHIP RAILWAY.

The *North American Review* for March, 1881, which has reached a second edition, contains a paper by Mr. James B. Eads, advocating the construction of a ship railway across the Isthmus of Panama, a Bill to authorise which project is now before Congress.

Mr. Eads commences by admitting the possibility of the canal proposed by M. de Lesseps, of which he states the revised estimate at 33,500,000*l.*, without including interest during construction. The time required for construction, owing to the "incessant and enormous" rainfall for six months out of the year, he thinks will be probably twenty years. But he assumes that it may be done in ten, making the interest, at 5 per cent., amount to 16,800,000*l.* We must, however, here observe in fairness to M. de Lesseps, that Mr. Eads has doubled the amount chargeable for interest, having given the sum to which 5 per cent. on the total capital, for the whole time, would amount.

Distances, heights, and such trifles, are not mentioned with any precision by Mr. Eads. Incidentally he states as to gradient that "at Tehuantepec 1 ft. in 100 ft. will be the maximum." The plan, so far as we can gather it, is to lay a compound railway of twelve parallel rails, the outer rails being 40 ft. apart. The platform (or car) which is to carry the ships to be transported is to be 375 ft. long, and 1,500 wheels are to support a structure covering 1,500 square feet. Mr. Eads appears to consider the question of the pressure transmitted to the earth by each wheel, which he states at 10 cwt. per square foot of earth, as the main difficulty with which the engineer has to contend.

"Within four miles of Washington," the article states, "a railway, composed of four rails, transports canal boats from the Potomac river to a canal which is about 30 ft. above it. The boats are conveyed over the railway several hundred feet to the other level. The total load each trip weighs about 300 tons. The canal boats are carried in a tank of water, about 7 ft. deep, yet the water does not burst out of the sides of the tank, although there are no beams across the top of it to tie its sides together."

But this prodigious moving dock (if the 1,500 wheels could all be made to move in unison) of 375 ft. by 40 ft. is not the most gigantic appliance projected by Mr. Eads. Turntables, long enough to carry the ship and car, will be placed where a change in the direction of the road becomes necessary. By this means the car and its burden may be turned to correspond with another straight line of track. From the surveys thus far made, it is not anticipated that more than three of such turntables will be required on the entire line of road." That is eminently satisfactory, though it would require the construction of greater stretches of mathematically straight line than have hitherto been considered practicable by the engineer. For as the platform is to be 375 ft. long, while "50 or 60 ft. of the ship would project over the ends of the car," it becomes a problem of no small importance how the wheels of the turntable itself are to be arranged, so as to work with that equally-poised concentric motion, any failure in which would either arrest the movement or tear the giant turn-plate to pieces.

Mr. Eads makes the objection (which we have often urged) to the payment of interest on capital during construction, that it is merely taking money out of one pocket and putting it into another. That, no doubt, is so. The sum is demanded as "call," and given back as "interest." We think it is the plan in which the ostrich would conduct its financial arrangements, if it had any to conduct. But, all the same, it is a plan which contents the public. It is a plan on which enormous sums are continually raised. We agree with Mr. Eads that "the fact that the shareholders have a five-per-cent. dividend-paying stock, tolls or no tolls, will stimulate new subscriptions until the canal is completed, or until this novel method of raising money fails." It is not novel, at all events in the Old World. But what is the substitute now proposed?

"The Bill before Congress in aid of the ship-railway requires that a guarantee of six per cent. dividend on fifty million dollars, or two-thirds of the capital stock of the company, shall be paid by the United States, for fifteen years, the guarantee not to include the principal." We should think not. If fifty million dollars, or 10,000,000*l.* be two-thirds of the capital of the company, the whole capital must be 15,000,000*l.* Six per cent. dividend on the lower amount for fifteen years comes to 9,000,000*l.* Mr. Eads therefore asks the Government to advance him 9,000,000*l.* out of the 15,000,000*l.* which he wants to spend. This would, of course, be very much more convenient to a projector than to have to obtain 41,900,000*l.* from the public, in order to spend 33,500,000*l.* on works, but we fear that no Government would regard it in that light. The financial project is as original as the mechanical one. Our American cousins have often set us admirable examples in the way of invention, but we cannot regard the "Isthmian Ship Canal" as having yet attained the state of practicable invention.

Of course, there are certain returns promised to the State, in the way of free transport of mails and war material, and of a certain preference by way of repayment of guarantee. These are details which it is not of any present interest to discuss. The points which will interest the English reader are,—first, what is the general idea of the advantage, to be obtained by the new line? and, secondly, what are the facts as to its feasibility?

As to the first, it may be frankly admitted that it would be greatly to the interest of the United States of America to have the isthmus traversed at Tehuantepec, in Mexico, rather than in its narrowest part, some 1,500 geographical miles to the south-east. It does not follow that the interest of navigation points in the same direction. A vessel sailing from New York to San Francisco would, no doubt, save some 3,000 miles on its voyage, but a vessel sailing from Lisbon to Lima would probably prefer the southern line of communication. It is rather, therefore, a question for the Americans themselves to decide what outlay they may think proper to make for the improvement of their coasting service, and for the political advantages of being able more directly to control a line of east and west transport.

As to the second question, the best thing that could be done would be to give an exact and faithful account of the actual working of the canal-boat railroad mentioned by Mr. Eads. We are not aware of any accessible account of this, and should like to see one before speaking further on the question of possibility.

We cannot fail, however, to point out how entirely the project of a fifteen-hundred-wheeled car lies without the limits of practical experience. Mr. Eads speaks of the independent axle of each wheel as a security against derailment. We hold in this country that it is the solid connexion of the pair of wheels which keeps the carriage on the track, and that if each wheel ran singly they would be more likely to run off. Again, the friction and counter-strain of such a prodigious set of wheels would be enormous. In fact, the projector has seen that such a monster car could not move round a curve. He has, therefore, proposed the giant turn-tables. As to this, it would be necessary (pending the invention of machinery such as has never yet been thought of) to have a lathe of 375 ft. in diameter in order to turn the bearings of the turn-plate. In 1833, when railway turn-plates were first made, the rollers were made with rounded peripheries, to save friction. The consequence was that their natural efforts to run off the bearing-rail at a tangent constantly broke the tie-rods, and caused much friction. The late Sir Charles Fox, we believe, suggested the expedient of giving to the rollers a conical periphery, the angle of the cone being determined by the distance from the centre of the turn-plate, and the bearing or circular rail on which the roller ran being turned so as to fit this cone of the roller. On this principle all our turn-plates, we apprehend, are now made. To apply this principle to a 375-ft. turn-plate would be no easy matter. And, if it were not applied, the turn-plate would prove to be unworkable. We only mention this as one instance of the enormous and unforeseen practical difficulties that would arise in the attempt to carry out such a scheme as a ship railway. We shall be glad to receive and to examine any information bearing on the subject. At present, however, it hardly seems to us to have been brought within the province of practical engineering.

THE "DEL PERDON" ENTRANCE TO THE CATHEDRAL OF TOLEDO.

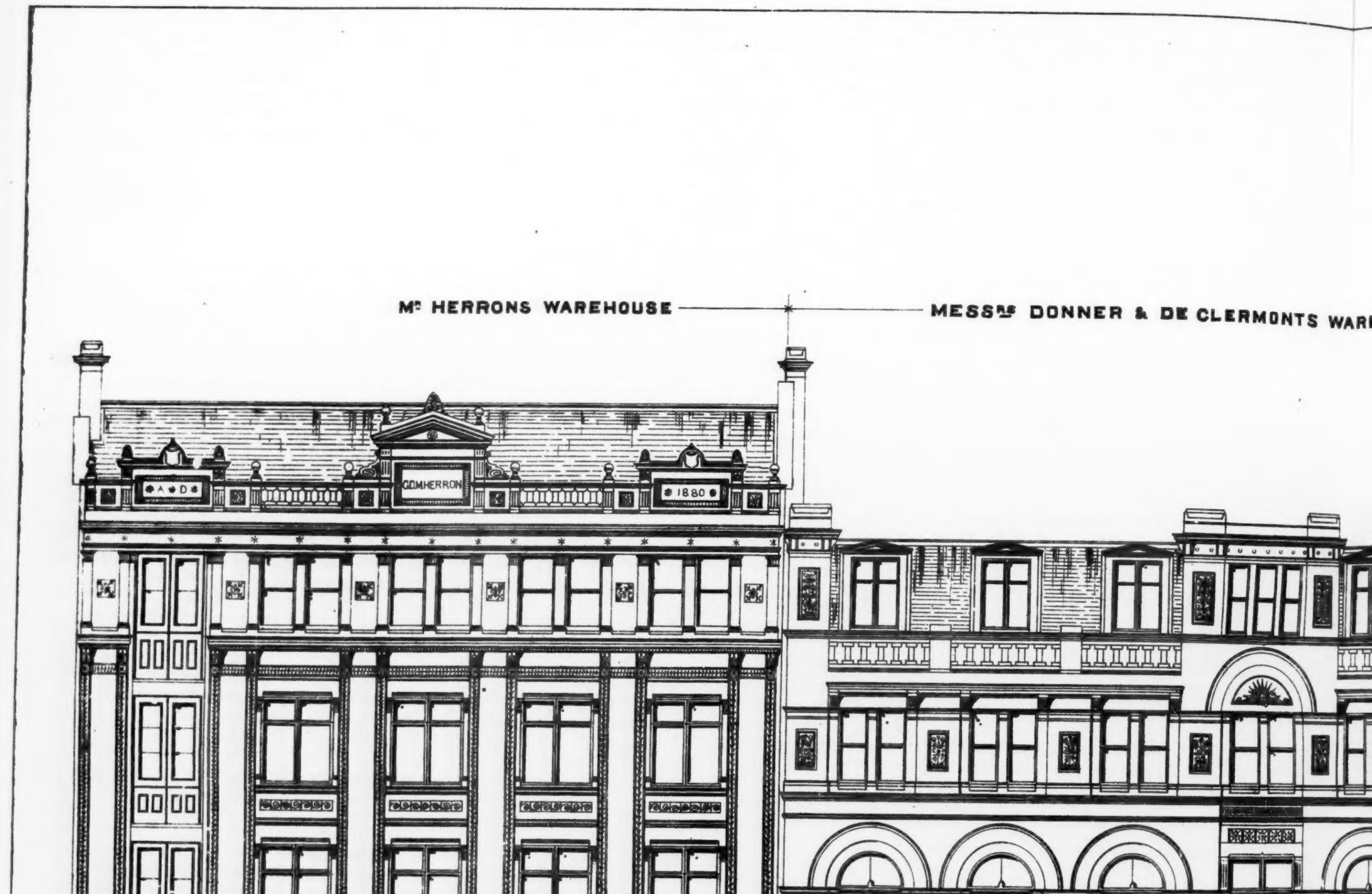
Continuing our purpose, which we have been carrying out for some time past, of acquainting our readers with the finest architectural monuments of Spain, we give in our present issue a view of the doorway "del Perdon," in the centre of the principal façade of the sumptuous cathedral of Toledo.

The general style of this porch is, like the rest of the cathedral, the Gothic, at the height of its richness. Speaking of the ornaments of the porch, a Spanish writer, Quadros, observes:—"It is necessary to contemplate the countless canopies, the beautiful figures of angels, prophets, and saints, which fill the six ogives of the central doorway, called 'del Perdon'; the interlaced compositions of the base; the grotesques; the severe images of the twelve Apostles ranged at the sides; and even more attentively, the exquisite relief of St. Ildefonso receiving from the Virgin the sacred vestment, which worthily occupies the tympanum of the arch;—it is necessary to behold all this, in order to comprehend the movement and fervour existing at that time (1418) among the artists employed on the rich details of the façade."

The Renaissance work which surmounts, and is made to harmonise with this, was constructed in 1787 by the architect Durango.

The erection of the cathedral of Toledo was commenced in 1227, at the instance of two men illustrious in the annals of the Roman Catholic faith, King Fernando III. and Archbishop Don Rodrigo Jimenez de Rada. The plans for this temple were designed by the architect Pedro Perez, who died in 1275; the details of the façade were executed by Alvar Gomez, assisted by eminent sculptors of this time.

Brighton.—The Spring Exhibition of Modern Water-colour Drawings, at the Pavilion, has been opened, and includes a number of very charming drawings.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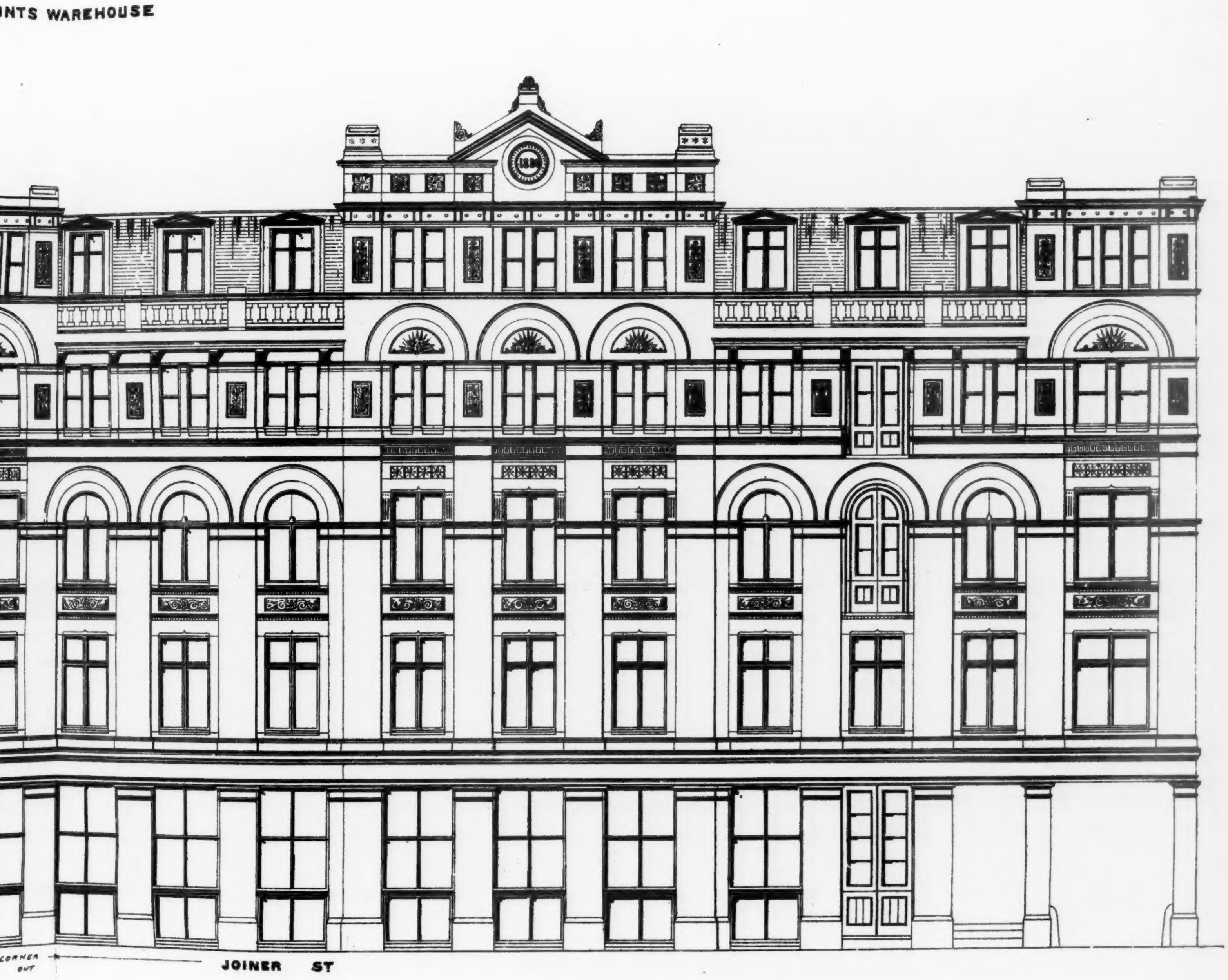
Whiteman & Bass, Photo-Litho 236, High Holborn.

WAREHOUSES IN SOUTHWARK.—M


NTS WAREHOUSE
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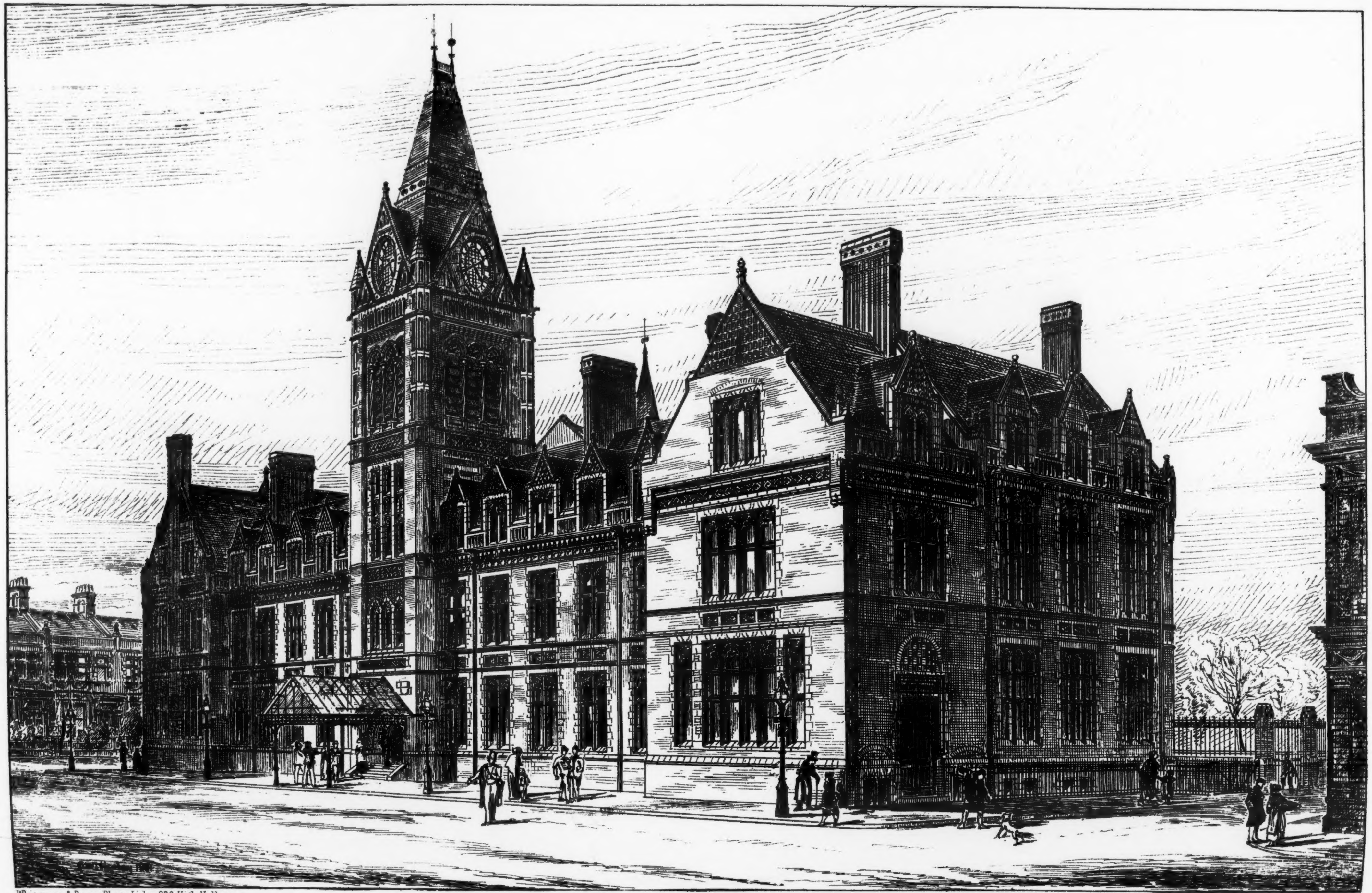
Wyman & Sons, Printers, Gt Queen St

WARK.—Mr. William Wimble, Architect.

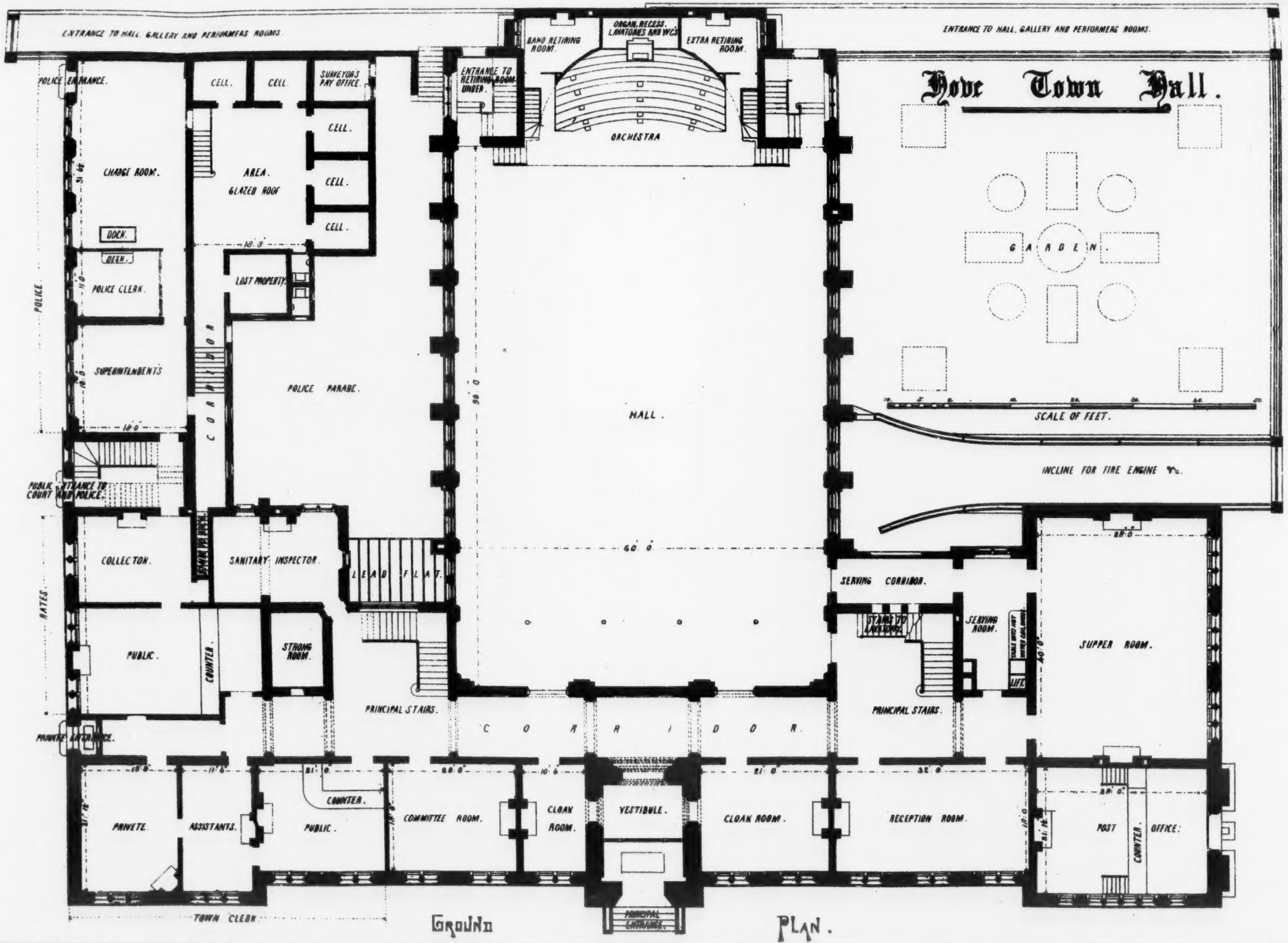


Whiteman & Bass, *Photo-Litho* 236, High Holborn.

HOVE TOWN HALL.—MR. ALFRED WATERHOUSE, A.R.A., ARCHITECT.

Wyman & Sons, Printers, Gᵗ Queen Sᵗ

Hove Town Hall.


ENTRANCE TO HALL, GALLERY AND PERFORMERS ROOMS.
POLICE ENTRANCE.
CELL.
CELL.
SURVEYORS PAY OFFICE.
CELL.
CELL.
CELL.
CHARGE ROOM.
AREA.
GLAZED ROOF
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DOCK.
DESK.
POLICE CLERK.
LOST PROPERTY.
POLICE
SUPERINTENDENTS
CORRIDOR
POLICE PARADE.
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PUBLIC ENTRANCE TO COURT AND POLICE.
COLLECTOR.
SANITARY INSPECTOR.
LEAD FLAT.
RATES.
PUBLIC.
COUNTER.
STRONG ROOM.
PRINCIPAL STAIRS.
PRIVATE ENTRANCE.
PRIVATE.
ASSISTANTS.
PUBLIC.
COUNTER.
COMMITTEE ROOM.
CLOAK ROOM.
VESTIBULE.
CLOAK ROOM.
RECEPTION ROOM.
POST OFFICE.
COUNTER.
TOWN CLERK.
PRINCIPAL ENTRANCE.
CORRIDOR.
PRINCIPAL STAIRS.
STAIRS TO LAVATORIES.
SERVING ROOM.
LIFT.
SERVING CORRIDOR.
SUPPER ROOM.
28. 0
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ENTRANCE TO RETIRING ROOM UNDER.
BAND RETIRING ROOM.
ORGAN, RECESS, LAVATORIES AND WCS.
EXTRA RETIRING ROOM.
ORCHESTRA
HALL.
90. 0
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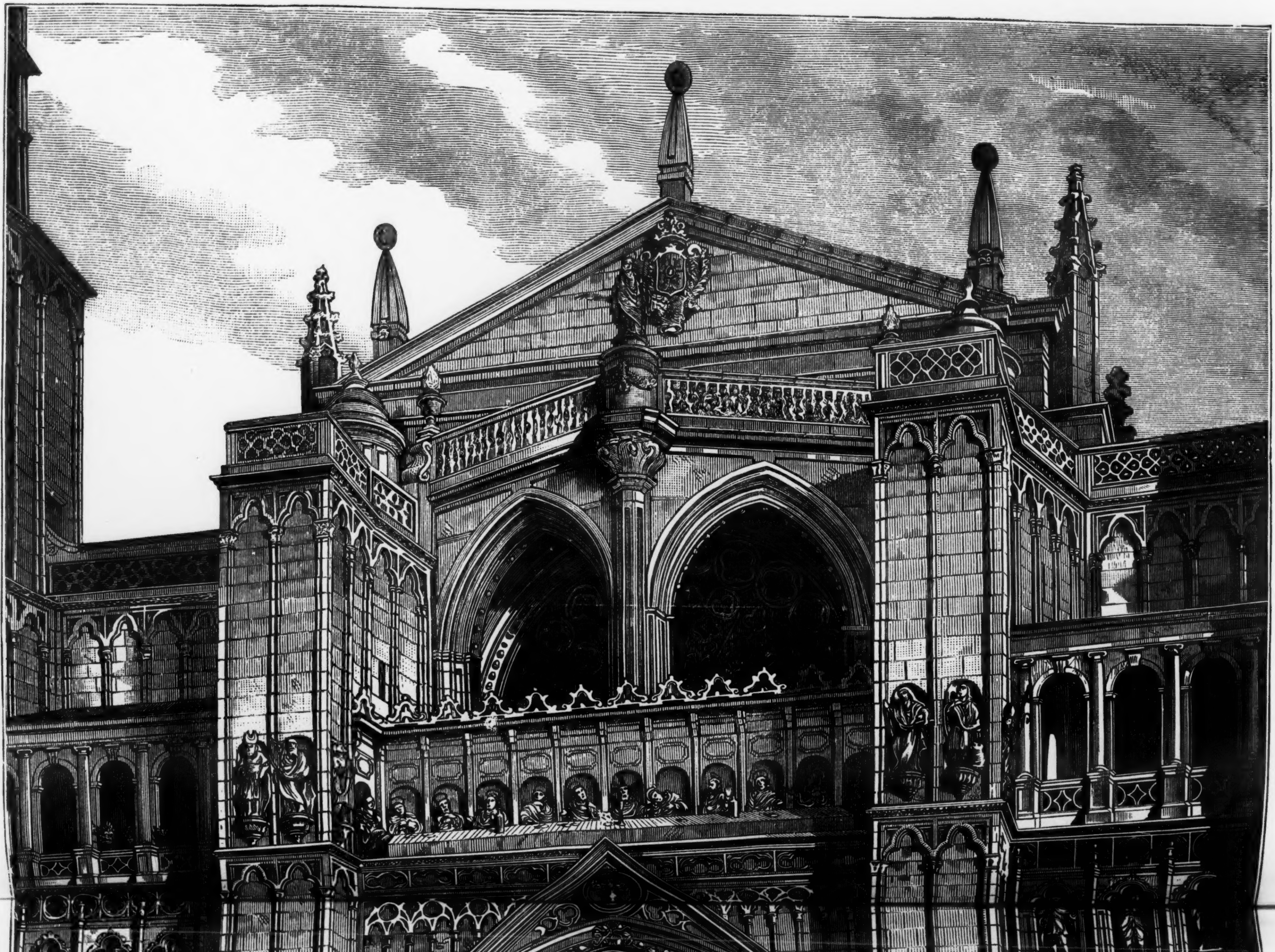
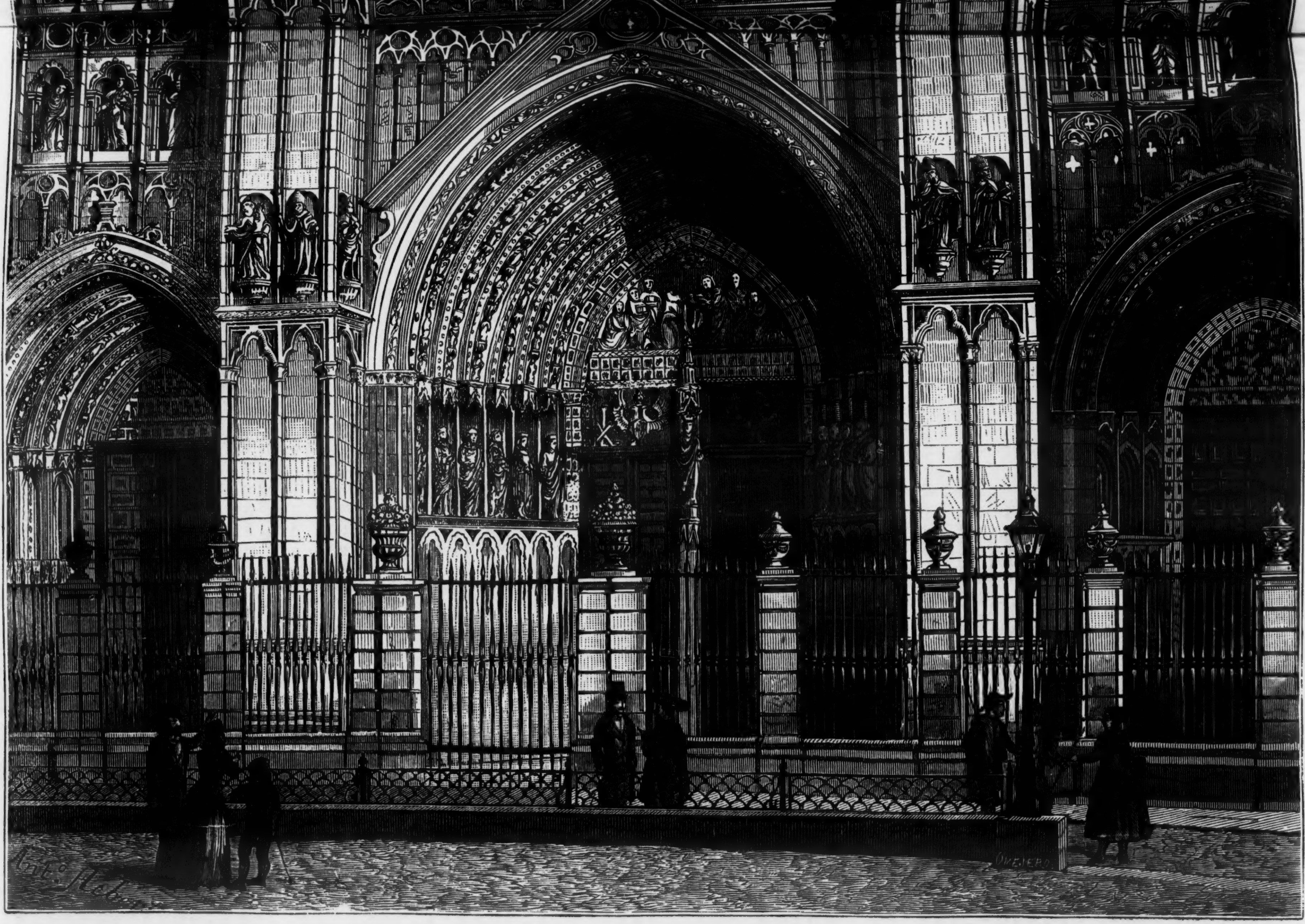
ENTRANCE TO HALL, GALLERY AND PERFORMERS ROOMS.
GARDEN.
SCALE OF FEET.
INCLINE FOR FIRE ENGINE &c.

GROUND PLAN.

Whiteman & Bass, Photo-Litho 236, High Holborn.

Wyman & Sons, Printers, Gt Queen St.





THE "DEL PERDON" DOORWAY, TOLEDO CATHEDRAL.

WAREHOUSES, ST. THOMAS-STREET, BOROUGH.

The warehouse at the corner of St. Thomas-street and Joiner-street, Borough, has recently been erected for Messrs. De Clermont & Donner, leather and hide merchants. It has a total frontage of 132 ft., and stands upon an area of 3,300 ft. super. The front is of Portland stone and white Suffolk bricks.

The first floor is entirely occupied for their offices, all the partitions and joiner's work being of wainscot and mahogany. The cost of the building was about 10,000*l*.

The contractors were Messrs. W. & F. Croaker, of Great Dover-street, and the architect was Mr. William Wimble, of Queen Victoria-street.

The adjoining warehouse is being erected for the business premises of Messrs. G. R. Herron & Son, leather merchants, of Bermondsey-street. This has a frontage of 50 ft. and an area of 2,850 ft. super.

The front is of Portland stone and white Suffolk bricks, with Brown's ornamental bricks. The ground-floor piers are of red polished Aberdeen granite. The carving has been executed by Mr. Sansom. The cost of the building is about 6,000*l*. The contractor is Mr. Morter, of Stratford, and the architect, Mr. Wimble.

HOVE TOWN HALL.

In our present number we give a double-page illustration of the town-hall at Hove, which is in course of erection from the designs and under the superintendence of Mr. Alfred Waterhouse, A.R.A.

The rapidity with which the town of Hove has increased as a place of fashionable residence has induced the Commissioners to provide for the wants of the community by the erection of a town-hall of suitable magnitude and importance. A fine central site has been chosen, having a southern aspect, with the principal frontage to Church-street, and return elevations to Norton-road and Tisbury-road.

The tower occupies the centre of the Church-street elevation, and the central hall is immediately behind it. The extension along Norton-road, being nearly as long as the hall, encloses a parade-ground for the police.

The principal entrance is in the middle of the south front, under the tower, and is covered by a glass-and-iron porch extending over the footway. The entrance leads to the corridor, which runs right and left along the wings.

The vestibule contains a memorial tablet of polished red granite, on which is incised the following inscription:—

TOWN OF HOVE.
THIS MEMORIAL STONE
WAS LAID ON THE 22ND DAY OF MAY,
MDCCCLXXX,
BY
JAMES WARNES HOWLETT,
CHAIRMAN OF THE COMMISSIONERS.
William Packwood,
TOWN CLERK.

The Hall, on the north of the corridor, is 91 ft. by 60 ft. by 40 ft., with a gallery at the south end extending along the east and west sides. At the north end, the orchestra is arranged in a covered recess behind a large semicircular arch, and a smaller recess at the back forms a chamber for the organ. The hall is lighted in the day time by a double range of two-light windows above and below the side galleries, and at night by two large sunburners. The ceiling takes the form of a depressed cove. The numerous places of exit make the clearing of the hall when necessary a matter of short duration. At its south end the two principal staircases are placed, one on each side, thus communicating with the galleries as well as the corridors on the upper floors. There are three stories of offices. On the ground floor, in the east wing, are placed, among other apartments, the reception-room, 32 ft. by 18 ft.; the supper-room, 40 ft. by 38 ft.; and service-room; and also the post-office, which occupies the south-east corner of the building, and is open only to the street.

In the west wing are situated the town clerk's offices, the rate-collectors', and police. On the first floor are the Commissioners' board-room, 32 ft. by 38 ft., and committee-room, 28 ft. by 21 ft.; the district surveyor's offices and School Board, magistrates' and solicitors' rooms; and police-court, 40 ft. by 30 ft., which is lighted by three windows to the west, and which has a gallery at its north end, opposite the bench, for the accommodation of the public. On the second floor are the kitchen and its offices, the housekeeper's apartments, and store rooms.

The structure is built of red bricks from Farnham, and red terra cotta from Ruabon, and the roofs are covered with green Westmoreland slates.

The style adopted is Third Pointed. The whole structure is of an ornate character. On two shields, one on each side of the principal entrance, are the arms of Sir Julian Goldsmid and Mr. Benett Stanford, who are the principal landowners of the district; and in the panel below the south-west gable are the arms of the town of Hove.

The contractor is Mr. Chappel, of London. Mr. Morgan is the clerk of works, and the arrangements for heating and ventilating have been entrusted to Messrs. Longden & Leeds.

SENTIMENTS AND SUGGESTIONS ON RAILWAYS.*

Being a friend to progress, which I believe to be a law of the universe, I am no enemy to railways in the abstract. No sane man, I think, could object to exchange the slow, jolting coach for the gliding carriage of thrice or quadruple the speed. Nor could any humane one prefer animal power to steam, if equal safety were guaranteed to him by the constitution of the system. I think it a glorious mode of changing place, could you feel secure during the operation, which nobody will contend that you can. In short, the railway system of Great Britain, which is an honour to the science of the age, flagrantly violates the law, alike binding on the institutions of man as on man himself,—the law written on our hearts, and, as both Christians and Jews believe, repeated from Sinai,—"Thou shalt do no murder."

It is absurd to say, as some do, that, because the accidents are few in proportion to the number of journeys, a railway carriage is the safest place into which a traveller can put himself. However few the accidents, and that they are so few is highly creditable to the various officials, —a proof that a great majority of them do their duty to the utmost that can be expected from human fallibility,—going on the line is like going into a field of battle, for it is entering an atmosphere of phenomena and contingencies equally abhorrent to our nature. What details of the bloodiest warfare could have made us shudder more than the news of the Tay Bridge disaster? The accidents from the clashing of trains has given to the once innocent word "collision" a new and dreadful significance. And now who can tell that next morning's newspapers will not be full of horrifying details by some such occurrence, or the train getting off the rails, or obstruction of the line, or failure of a viaduct, of a catastrophe involving the mangling, mutilating, nay annihilating, as at Abergele some years ago, which was something between death and annihilation, of hundreds of men and women, to whose fate, being men or women ourselves, we cannot, if we would, be indifferent? Whence arises it?

The chief cause of this condition of our railways is, I believe, their having been in most cases designed in short lines from one great town to another by rival companies without regard to general perfection of plan, and consequently as a system fraught with the errors inseparable from the limited views of private speculation and commercial enterprise, viz., want of unity and organisation. Another cause is the running of too many trains in a day, leaving too little space between them. What is called the block system,—securing some two or three miles between a train and the one following it,—introduced to remedy this, has no doubt done good, but it is insufficient, as it does not allow time enough for signalling in case of the first being stopped. It was through this the collision occurred in the Bleamoor Tunnel, near Ribblehead Station, in August last, when a train was stopped by the brake getting disordered. Had the Pullman Express been an hour behind the other instead of a few minutes, the collision could not have occurred. The lives in the two trains hung on the chance of the senseless brake keeping in order.

The great defect of the system is its making the lives of the passengers depend on the memory, watchfulness, sobriety, conscientiousness, or state of mind of the officials, when it is evident that, however sober, conscientious, or vigilant an official might be, he at any moment might be seized with illness, or receive tidings from his home that would drive everything else out of his mind. But supposing the signalmen to be always in the full possession of their faculties, and doing their best, they have in most instances too distracting a task and too many lives depending on their perfect performance of it for any human beings. At such stations as those at Charing-cross and Cannon-street the working of the signals employed in the direction of the traffic over so many lines demands a staff of guardian angels instead of men. That the whole framework of the system at present depends for its safe working on the vigilance and conduct of officials is proved by the fact that accidents are almost always traced to the want of care or mistakes of officers and servants, alone or in combination with defective signal and switch arrangements, and a want of telegraphic communication.

To go on complicating and perplexing this system by increasing its component parts, and thus place profit of shareholders and commercial convenience before human life and happiness, is contravening our civilisation. We mark our sense of the importance of health over everything else in the world by the universal salutation, How are you? How do you do? And yet we are content with a system of travelling formed as if for the very purpose of putting health and life itself in jeopardy. The insurance of these by the companies, though some safeguard to the public no doubt, was the severest condemnation that could have been passed on the system; while the supposition that it could be satisfactory was a satire on humanity. Such systematic ignoring of the sanctity of human life has, as in the case of war, a demoralising effect. Its victims may be said, in Scripture phraseology, to "die as the fool dieth."

These errors, and the fact that the unchecked growth of the railway system,—which it would seem from the increased number of Bills before Parliament this season nobody has any idea of limiting,—must in time convert broad England into narrow England as regards its arable land, point, I think, to the need of its being placed, as in some foreign countries, under State control and organisation. I do not mean that the railways should become the property of the Government, though their relative importance and regard for consistency might warrant the suggestion. Write the most unimportant letter or note, and a right hon. member of the Government will undertake its delivery; but resolve on a long journey, and you must trust your precious person to the keeping of mercenary companies. Placed under the wing of Government, there would, of course, be a general manager, who should be some first-rate engineer of comprehensive mind, with a staff the most able for carrying out his designs that could be procured.

How he would modify the present system, I dare not attempt to say. Yet it may be profitable just to consider how such a man, supposing him perfectly conscientious, would have planned them from the first, or would replan them now, supposing the entire country were cleared for him.

He would, I think, take the map of Great Britain and mark first a great primary trunk line from London by Birmingham and Liverpool to Edinburgh, branching off at Birmingham to Leeds and Newcastle on the one hand, and to Holyhead on the other; and from London again on the other side, to Bristol and Dover respectively; and so on, with secondary and tertiary lines to lesser places, but not to every insignificant town or village. At a certain point he would stop, and all on this actual railway and steam locomotive to go no further, completing the ramification into every village, however small, by omnibuses on the old roads, and thus avoid complicating the railway systems; by which plan the general convenience of the public would be far greater than at present. He would have but one line joining the same two places, never two parallel ones; and admit no surface crossings whatever,* but conduct the two lines or line and road under or over one another by means of a bridge. He would have a broad gauge, and no curve but of such large radius that danger from centrifugal force of carriages leaving the rail would be out of the question;

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* Read to the Liverpool Architectural Society, April 6th.

* The *Porcupine* (Liverpool) calls my attention to a "most dangerous crossing at Seaforth, near Liverpool, where children swarm and pedestrians are numerous."

and such a mound of earth as a fence to every elevated line, that if, by any chance a train did escape from the rail, it could not fall over the embankment. He would have the whole line, on whatever level, to be fenced by a wall, especially strong or doubled over rivers. He would have all bridges and viaducts of great breadth, and of a strength above suspicion, and all arches of ample dimensions for passage of the trains through them. He would have no single track anywhere, and all tunnels relieved by frequent and large shafts to the surface.

Conscious that railways are but a means to subserve the great ends of life and not to destroy them, and that they are necessarily unpicturesque in form, the very opposite to the flexuous line of grace, he would exclude them from any district remarkable for the beauty of its scenery, and substitute omnibuses on the old roads, in connexion with the railway system.

He would have no underground city railways eating into the bowels of the earth, and interfering with water and gas. He would have separate lines for goods trains throughout.

He would plan the terminal stations, as well as the intermediate ones, throughout the land, as similar to each other respectively as possible, so that they would become as familiar to every traveller as his own house. They would be void of ornament, but include every apartment and thing needful for the comfort of travellers and the comfort and health of the railway servants. At the intermediate stations, passengers would be saved the necessity, after taking their tickets, of crossing the line to their trains, by a way under or over. All stations would be well lighted, and their names prominently posted.

Under such wise management there would, I think, be but two classes of carriages, and, for passengers more readily finding their carriages, the two classes would be painted different bright colours, say one of red, the other of yellow, and before the starting of a train there would be a signal warning everybody to be outside of a longitudinal line, marked on the platform, two yards from the carriages. There would be no special carriages or arrangements for gentlemen attending hunting meets, nor sleeping-saloons, nor lavatories, the providing of which must draw the attention of officials from more essential things, but invalid-carriages there would be, and ordinary carriages would be so far open and united that no passenger, male or female, would be liable to any species of insult or injury within, which would render unnecessary a passage outside for the guard, so much talked of. With these arrangements, water-closet and urinal accommodation could easily be included. All carriages would be well lighted. Last, but not least, the daily trains would be reduced in number to one-half, and made proportionately longer in carriages. The ordinary second-class fare would be reduced to the lowest possible rate, and no excursion trains allowed, nor tourists' tickets for circular or other trips, nor return-tickets to pleasure-parties, all which tend to complicate the system. The speed would not be reduced, but limited, and made as uniform as possible, with fewer express trains, in order to which the intermediate stations would be placed not less than six or seven miles apart.

There would be resident workmen plate-layers or what-not distributed over the whole lines, each in charge of a fixed portion of the tracks to keep them in perfect order and repair. Also workmen similarly in charge of engines and carriages, so many of one or the other to each man, whose duty it would be to keep them in perfect working order.

The simplification of the system would lead to simpler guide-books than the present ones, which seem, some of them, admirably adapted to puzzle uneducated people, and are themselves condemnatory of the system they serve. They would be free from Latin words, as *vid*, and from abbreviations, as a.m. and p.m. for periods of the day, the hours of which might be counted straight on from one after midnight to twenty-four. The hours of train-departure would be unchangable through the year. Each class of tickets would be of the same colour as the class of carriages to which they would admit.

Though the system would be infinitely less dependent on the sobriety of officials, it would still, perhaps, be deemed advisable that they should all be total abstainers, and that no intoxicating drinks be sold at the stations.

It is plain, I think, that a totally different and superior system to the present one, the work of such a vast multitude of companies at different times, would thus be produced. Its greatest improvements, I think, on the present one would be having longer intervals between the trains and fewer stoppages, which latter, in contributing to equality of speed, would greatly contribute to safety. Besides, stopping at every village defeats the object of railways; like some omnibuses I have seen in Liverpool stopping at everybody's door. With greater intervals between the trains fogs would be little feared. Almost the only thing that would remain unchanged would be the speed, which should be as high as consistent with security of the wheels on the rails, because that is the glory of the railway system of travelling, and allies it to the electric telegraph. In it we see man repairing by intelligence the deficiencies of his physical nature, and taking, as it were, the wings of the morning, which, indeed, the steam locomotive has been to millions of town-imprisoned men, enabling them to fly away from the din and bustle, and be at rest.

But it is important it should be borne in mind that, like all earthly things, the railway mode of travelling, even divested of all danger, has its disadvantages as well as advantages. To the astronomer and the geologist such speedy means of changing place may afford facilities for making their observations; but to some other students of nature, as the botanist and the zoologist, it is useless, since at railway speed they can see nothing on the way. For their purpose the steam locomotive must yield, not only to the old coaches and canal boats, but to the slowest means of all,—walking,—which, at the rate of ten or twelve miles a day, up hill and down dale, and clear of tunnels, is allowed by cultured travellers to be the best mode of travelling for doing justice to any beautiful or historically interesting country; as it certainly is for strengthening the muscles and expanding the chest. As to canals, whilst they beautify the country through which they wander, they render a journey by them a romance.

Again, their greatest advocates must admit that railways are anything but ornamental to the country; canals, roads, lanes, join with rivers and lakes, mountains and glens, in variegating and beautifying the face of nature; but a railway is a line of blasted earth,—the ugliest track or trail ever marked by man or beast on the face of the earth, while high embankments are obviously eyesores and obstructors of the view.

Viewed in another light, the railway system is not an unmixed good. It has, I think, created a mania for change of place for the sake of change. It has caused, I fancy, both towns and villages to change their inhabitants more speedily than formerly, and thus made the proverbially fleeting scenes of life more fleeting still, scattering family groups and circles of friends more swiftly over the earth than ever before. All men are pilgrims once more,—not to the Holy City, but to the nearest station. And if, perchance, you meet an old friend you have not seen for some time, it is ten to one that before you can ask him a question, he slips off, "having to catch a train."

Samuel Huggins.

THE NATURAL HISTORY MUSEUM, CROMWELL-ROAD.

Sir,—Many opinions as to the merits and demerits of the vast Natural History Museum, a section of which is now opened, have already appeared in the press. Those, however, to whom the Museum is to be of actual use have been reticent, and it seems desirable it should now be considered from the utilitarian point of view. Notwithstanding the consideration you always show for architects, I think, and others with me, that you are bound to allow fair discussion as to the qualities of such an important building as this.

The palæontological, mineral, and botanical collections are now housed in their new domicile, while the zoological section still remains at Bloomsbury. The arrangement of palæontological and zoological divisions was formerly, roughly speaking, on the same plan. The vertebrata occupied the high cases which wainscoted every room in what were respectively the chief galleries, and the invertebrata (shells in one and fossil shells and minerals in the other) were exhibited in sloping desk-like cases ranged in two rows down the galleries. For the next few months the old and new arrangements can thus be compared in the two buildings. The old arrangement was severely condemned in 1878, by Professor Huxley, who said that a visit to the stuffed-bird gallery depressed him and made his head ache,—that birds stuffed in the ordinary manner are far less useful to the students than properly-dressed skins and bones, which can be kept in drawers, and that, if a selection of the more striking forms were alone exhibited, naturally set up with nests, eggs, and young, they would be more appreciated by the general public, and less tiresome than the monotonous repetition of similar-looking birds perched in rows in identical attitudes. A number of birds, especially British, have since then been set up in small cases in a most charmingly natural manner, and a few magnificent birds of paradise, horned owls, &c., exquisitely stuffed, have been singled out to occupy separate cases, and foreshadow, we hope, the coming arrangement.

In the main, however, it is, of course, impossible to carry out Professor Huxley's recommendations at once. The birds cannot be unstuffed, and if unsatisfactory in other respects, they will at least form an imposing array in the gallery destined for them. These remarks apply almost equally to the whole of the collections.

It would be useless here to sketch the actual arrangements intended, and which have been thoroughly explained in *Nature*, further than to say that the collections as yet removed are all located in the right wing, and that the left wing and centre are unoccupied and closed. On entering we find ourselves in what appears to be a very beautiful and elaborately-decorated Norman cathedral. The details of the ornament are seen, however, on closer examination, to be entirely novel, being, for the most part, adapted from fossil and recent plants, with the introduction, in places, of apes and stranger creatures than were ever wotted of by Norman monks. The pillars taken from the old carboniferous tree trunks are particularly rich, and many of the capitals, while preserving a general Norman feature, are most happily composed of long-extinct foliage, which the student cannot fail to recognise with pleasure. As a mere architectural detail, the roof seems rather disappointing, the iron girders appearing too slight for the massive cluster of columns which support them, and which look intended to carry a stone-vaulted roof. Further, its railway-station construction, scarcely concealed by the decoration, does not seem quite in harmony with the cathedral-like walls. This is to be known as the Index Museum, a pet project of Professor Owen's, and is to receive the marvels of Nature exemplifying size. It was once contemplated to concentrate the objects of chief interest here, such as the huge skeletons of mammoth Elk, Dinornis, and Glyptodon, but the keepers of the departments very properly remonstrated that to leave them with the detached bones, and without the perfect skeletons which alone render these intelligible to the general public, would deprive the main galleries of their most attractive features. This central portion of the museum is so generally cathedral-like, and richly decorated, with its splendid mosaic floor, that it seems little less than desecration to intrude anything upon it with less repose than Mediæval effigies, or Chantrey and Canova tombs. The skeletons of the common whale and the cachalot, which are to cut up its floor, the stuffed giraffes, which are to crane their necks towards the painted plants upon the roof, will look like intruders. The building does not appear designed "for the likes of them." Those who go for the architecture must think their presence a disturbing feature, while those who wish to see the specimens will find them dwarfed, I fear, by the architecture.

The aisles are divided into twelve recesses or chapels, which are to contain an epitome of the whole animal, vegetable, and mineral kingdoms, presumably to enable those who take small interest in such things to "do" the Museum in the shortest possible time, and without entering the galleries. It is difficult to see how these epitomes are to be arranged attractively in these recesses, but Professor Owen has doubtless well considered this matter. Beyond the Index Museum is another much smaller though equally lofty hall, intended to hold the British zoological collection. To the right of the Index Museum is the main palæontological gallery, 233 ft. in length. On entering, one is disposed to ask where the fossils are, for the first glance shows little more of their presence than what can be seen of the half-dozen skeletons and skulls ranged down the centre. The view of the recesses in which the collections lie is cut off by a double row of flat-sided Italian-looking pillars, which have the effect of narrowing the gallery to a passage, and, if unnecessary to the support of the roof, would be better away. The decoration is on buff terra cotta, with no other colour than whity-black bands of the same material. Extinct fish are moulded in some relief on the flat pedestals of the pillars, and extinct marine and terrestrial plants on their panelled sides above. The girders serve to panel the ceiling, and a little distemper colour is here rather effectively introduced, but marred by a sham girder running in an unbroken line from end to end, presenting a railway-like perspective, and claiming attention the moment the gallery is entered. Of all the rooms yet opened to the public, by far the best adapted to their purposes are the long gallery devoted to the fossil Reptilia, and the side galleries leading from it. In these, architectural ornament is subordinate, and we have down one side of the Reptile Gallery a magnificent and unbroken range of cases, 225 ft. long, displaying the grandest series of ichthyosaurs and enaliosaurs ever seen. These are chiefly British, and their marvellous preservation and beautiful proportions must strike even the least instructed; while those who remember the dirty and dingy condition in which they were perforce kept at Bloomsbury will congratulate themselves heartily on their removal. In the Mineralogical Gallery, above the Gallery of Fossil Mammalia, there is too much architectural ornament. Here, however, the cases are all desk-shaped and away from the wall, and are therefore not much interfered with, while, being well lighted, the minerals themselves are seen to advantage. The treatment of the ceiling seems slightly preferable in this instance. Of the Botanical Gallery above, not much is visible to the public, a larger part being reserved for the Herbarium and the use of students. Down the centre are three bronze cases, 14 ft. in height, like miniature conservatories. Their enormous cost seems out of proportion to the contents of withered, dusty-looking trunks of palms and tree-ferns which can be seen growing to perfection at Kew, less than an hour distant.

Looking at the building as a whole, while we may well be proud that so magnificent a pile has been reared among us, we cannot help feeling that for the purposes of a Natural History Museum, different proportions and less elaborate terra-cotta decorations might have made it more useful.

A NATURALIST.

MILAN EXHIBITION.

ON the 1st of May King Humbert of Italy will open a great national exhibition at Milan. The objects exhibited embrace all branches of Italian art and industry. More particularly will the attention of visitors be attracted by a collection of works of the Old Masters, an Agricultural and Horticultural Show, an Exhibition of Musical Instruments, and an assemblage of works and objects presenting a history of labour. The city of Milan is doing its utmost to make the exhibition a splendid success. The celebrated theatre of the Scala is preparing an extraordinary series of representations for the period of the exhibition. The plastic arts will be well represented in the modern department, in which the number of paintings will be 3,000, besides 1,000 works of sculpture.

ANCIENT EGYPTIAN RUINS AND MONUMENTS.

THE Egyptian Government early in the present year adopted the resolution to take systematic measures for the preservation of all the great ruins and monuments of ancient Egyptian architecture situated on the plain of Thebes. The Egyptian Minister of Public Works was accordingly instructed to draw out an appropriate plan, with an estimate of the annual cost of carrying out the scheme. In pursuance of this object the Minister some weeks ago sent a Government architect, with a number of assistants, from Cairo to Luxor. This functionary has particularly to ascertain and report upon the best means of preserving the various ruins in this part of Egypt from further decay and thoughtless or wanton injury. It is understood that, in order to protect the extraordinary architectural remains at Karnak, Luxor, and the vicinity from the constant damage to which they have hitherto been subject at the hands of the native population, as well as of various tourists, the Government has determined to surround every ancient monument of importance with walls, and to admit spectators only through gates, that are to be placed under the care of resident gatekeepers.

A ROMAN VILLA NEAR AIX-LA-CHAPELLE.

IN the first century of the Christian era there were several Roman colonies settled in the neighbourhood of Aix-la-Chapelle. The architectural remains of these settlements hitherto discovered have not been numerous or important. Some time ago, however, a forester discovered in a wood near Stolberg the lower portion of a piece of sculpture, evidently of Roman origin. It was part of a sitting figure, and the material was the red sandstone of Trèves. Researches which were immediately afterwards made on the spot where this object was found led to the discovery of a number of Roman tiles, broken earthenware, and foundations of walls. But nothing of great importance was unearthed until the matter was taken up by a local society. Last September systematic excavations were commenced. Within a week the walls of an extensive Roman villa, covering an area of 120 ft. by 65 ft., were laid bare. Various remains were also found, including a second figure in Trèves sandstone, a pillar, the capital of a pilaster, various earthenware remains with a fine brown varnish, numerous iron nails, a large pair of shears, similar to those now used in sheep-shearing, a copper button, as large as a crown-piece, probably an ornament of horse-trappings, a grinding-stone, and various pieces of wall-decoration. All these objects were discovered in laying open the external walls of the building. The excavation of the interior was not commenced last year, but is now about to be begun. The work is looked forward to with considerable interest by German antiquaries, as from the discovery already made it is anticipated that the result will be the finding of the completest and most extensive remains of a Roman villa in the province of Rhineland.

NEW HOTEL BUILDINGS IN THE CITY.

A NEW hotel of large dimensions, and containing upwards of two hundred bed-rooms, with extensive accommodation for visitors, is about to be erected in the City, by a company formed for the purpose. The company propose to purchase the old-established City Arms Tavern, in St. Mary-Axe, and rebuild it on a much larger scale, adding extensive commercial hotel accommodation. For this purpose they have secured land adjoining the present building, covering an area of 6,780 superficial feet. The ground-floor portion of the building is intended to be let for general business purposes, the whole of the upper parts being devoted to the business of the hotel itself. The cost of the intended hotel is estimated at 60,000*l.*

WREXHAM IMPROVEMENTS.

A VERY desirable and important system of street improvement is now about to be carried out by the Wrexham Town Council, in order to accommodate the extraordinary increase of the business of the district. The old narrow streets have long been a source of great danger to all engaged in the traffic of them, and especially so during the last few years, with the great progress which has arisen with the trade in beer, zoedone, and leather. We are glad to see the corporation have at last faced the difficulty in good spirit by opening up new thoroughfares to relieve the traffic in the principal streets. They have obtained permission from the Lords of the Treasury to borrow 12,000*l.*, and with this they have made a commencement. This week they have let, by tender, to Messrs. Davies Bros. a contract for the conversion of the brook (which has long been an eyesore) to a 10 ft. culvert, for a length of about 700 ft. The arch will be of fire-bricks set in Portland cement, the top of which will be added to Brook-street, and will form a terminus for the tram-cars. The Great Western Railway have also just let, by tender, the taking down and enlarging the railway station. The buildings will be set back some 5 ft., so as to give additional platform space. This contract has also been taken by Messrs. Davies Bros. The plans for the corporation work have been supplied by Mr. J. M. Smith. the borough surveyor.

CRYSTAL PALACE SCHOOL OF ENGINEERING.

THE distribution of certificates awarded by the examiners for the Eastern term to the successful students' of the Crystal Palace Company's School of Practical Engineering took place on the 13th inst., the distribution being made by Lieut.-Colonel J. U. Bateman-Champain, R E, director-in-chief of the Government Indo-European Telegraph Department.

The report of the Examiners stated that in the Mechanical Engineering section (first year's course) thirty-two students had attended the lectures on steam; twenty-six were eligible for examination, and fourteen passed satisfactorily. At the head of the list were H. Sadler and E. S. Tiddeman, who were bracketed as equal. The second named was placed first in order of merit in the drawing-office department. R. J. Money was first in the pattern-shop, and H. Sadler first in the fitting-shop. Of those examined in the second year's course, G. W. Floyer and W. H. Jordan were placed first of the first and second term students respectively. The examiners, Messrs. W. F. Batho, M.I.C.E., and G. E. Eachus, M.I.C.E., reported highly of the general results of the examination of the pupils and their work, and of the system of the principal, Mr. J. W. Wilson, and vice-principal.

Lieut.-Colonel Bateman-Champain, in addressing the students, said they were being well and methodically trained for one of the noblest professions open to the youth of the present age. Most of them were about to enter upon a profession which, if pursued with assiduity, would enable them to reap honour for themselves and confer great and lasting benefits on their fellow-creatures. The civil engineer, and, of course, the mechanical engineer, was pre-eminently a civiliser, and, if he was said to have done good who made two blades of grass grow where one grew before, what should they say of those who constructed roads, bridges, harbours, docks, and other works of inestimable utility? He had lately returned from an arduous journey through a country where the civil engineer was very nearly unknown,—and a ride through Persia at some seasons of the year was sufficient to make one recognise to the full the value of the civil engineer. If they could imagine what England would be without the conveniences and luxuries that were supplied by the agency of the civil engineer they would thoroughly realise the importance of the profession which they were about to adopt; and they ought to do so, for no one ever rose to eminence in it who did not love his work and take an honest pride in his profession. The civil engineers had only existed as a distinct profession for a little over 100 years, and most of their great pioneers,—as the elder Brunel, Telford, and the elder Stephenson, —were self-taught men. It was only during the last twenty years or so that adequate attention had been paid to the training of young men for the profession of civil engineer, and it was still more recently that the practical and theoretical training had been properly combined. It was for that purpose that the Crystal Palace School and others in different parts of the country had been established. There was no doubt that twenty years ago the theory was very much neglected. In a large, highly civilised, and advanced country like this, there was never any insuperable difficulty in obtaining some practical knowledge, but the theory was neglected, and so rare was the combination of the two that it was admitted on all hands that the foreign civil engineer was far ahead in many points of the profession of the English engineer. That could scarcely be said now. There were complaints that the profession of civil engineer, like every other profession, was overstocked in this country. If that were so he advised the students to look abroad. The field of their labours was not bounded by the Straits of Dover. The whole world was open to them, and none but the idle, the weak, the vacillating, or the absolutely incompetent would fail in attaining some measure of success.

Explosion of a Sewer.—A serious explosion of a sewer is reported to have occurred a few days ago at Friburg. From an investigation which has since been made it appears that a carboy of benzoline had been overturned in the cellar of a drug-store, 100 mètres from the scene of the explosion. The contents ran into the main sewer, where they were rapidly converted into gas, which, finding its way into a house, took fire and exploded the moment it came into contact with a flame. The injury to property was considerable; but, though people passing in the street were thrown down as if by a violent earthquake shock, no lives were lost.

MOTIVE POWER AND NATURAL FORCES.

LIVERPOOL ENGINEERING SOCIETY.

At the usual fortnightly meeting of the Liverpool Engineering Society, held at the Royal Institution, in Colquitt-street, on the 13th inst., a paper by Mr. G. C. Thompson, on "The Application of Natural Forces to the Production of Motive Power," was read.

The author treated his subject in a general manner, dwelling on the possibility of much mechanical knowledge possessed by the ancients being lost at the present day, citing as a proof the ruins of Baalbec, where some of the stones employed in construction, according to the author's calculation, must have weighed 840 tons and required the united strength of 25,000 men to lift into position. Having pointed out some obvious disadvantages in the use of steam and its substitutes, the paper suggested the use of compressed air to be obtained by automatically utilising the rise and fall of the tide, according to a detailed description and diagram, the main feature of which was the enclosure of twenty acres of coast-land and the formation of a large air-tight space to be acted on by the tide, which on rising would pass through an inlet pipe and force the compressed air through an outlet pipe at the upper and opposite side, when it would become a prime motor.

The second portion of the paper treated of the utilisation of the wind by means of windmills and pumps for effecting a similar purpose.

TECHNICAL INDUSTRIAL EDUCATION IN CONNEXION WITH MECHANICS' INSTITUTIONS.

A paper on this subject, by Mr. Edward T. Bellhouse, was read on April the 13th, to the Manchester Statistical Society. In opening his subject, the reader said,—It may be advantageous to note in passing some of the circumstances which have at length aroused in England the earnest attention of the merchant, the manufacturer, the inventor, the employer, and the artisan. The greater spread of knowledge of what is going on all over the world by means of the telegraph and the penny and halfpenny daily newspaper, accessible to all classes, must be acknowledged to be the principal agents in producing the change which has happily taken place in the feelings of our people. The apathy and neglect arising from ignorance are fast yielding to zealous and earnest endeavour which an extended acquaintance with the subject has produced amongst all classes, actuating them with the desire and ambition to regain the proud position of ascendancy formerly held by our countrymen. We, in Great Britain, have been vain-gloriously exulting in the imagined superiority of the Englishman over the native of any other part of the world, considering ourselves stronger and more muscular in body, more capable of sustained exertion, and more clever in invention, than the foreigner. Some ground for excuse may, perhaps, be urged in the fact that the Anglo-Saxon race seem to have great pluck, strength of will, energy, and perseverance, as witnessed by the influence they exercise on the countries to which they emigrate. Whilst we have been looking on self-complacently, with folded arms, content with the presumed proficiency already attained, other nations have not been idle; so we will turn our attention to what has been going on elsewhere. Germany has long possessed, in good working operation, technical schools for all the principal manufacturing towns, and France and Belgium have had the same system to a more limited extent. In the universities and colleges of Switzerland, especially in the canton of Zurich (which may be considered the Lancashire of that country), at Berlin, at Stuttgardt, and at Carlsruhe, also in Austria and Hanover, technical training in science and industrial pursuits has been for a long period carried on to the manifest advantage of the people. In the twenty districts of Paris, the Government provides and maintains for each a science school, in which geometry, drawing of machinery, practical mechanics, and other subjects are taught to apprentices, who are obliged to attend these science schools, the time of leaving their employment being arranged to enable them to do so. A special school in La Villette, Paris, of which the instruction is free, is on an excellent system, the produce of the work of the pupils being nearly sufficient to cover expenses of management and pay for the materials used by them. The boys range from thirteen to sixteen years of age, being supposed to have done with the elementary stages. They are thoroughly trained in the handicrafts of wood and iron, receiving at the same time a general education in modern languages, history, mathematics, drawing and mechanical principles. The school in the Rue Tournefort receives boys at the age of ten into the workshops for carpentry and cabinet-making, turning in the lathe, blacksmith's work, and so forth, whilst the elementary scholastic education goes on at the same time. In the United States of America, the citizens of which will probably be our most formidable trade competitors, they are fully alive to the necessity of the system of technical schools. The Massachusetts Institute of Technology, which has been at work for fifteen years, unites a society of arts with a technical school of industry, and combines a liberal with a technical education.

Mr. Bellhouse then gave an interesting sketch of the steps that have been and are being taken in England with the view of promoting technical education.

To those who think upon the subject of this paper it must be evident that good, sound, genuine technical training in the principles and practice of the trade, art, or profession followed by any class is of vital importance to the community, and it behoves every British patriot to do his utmost to promote such a system as shall enable our countrymen to compete with foreign nations in the race of industrial proficiency, progress, and success.

BUILDING PLOTS.

Considerable benefit doubtless arises in acquiring land on the ten years' system, with free conveyance, but care should be exercised when buying from other than companies of repute or vendors well known. "A Reader for Twenty Years" writes us from Essex of the abuse he was subjected to from the auctioneer at a recent sale, for asking the insertion of a few words, that the vendor would "convey free from incumbrance." The appeal, however, provoked discussion, and a disclosure that the property offered was mortgaged, and that the mortgagee would not concur in the sale, and before any one would bid the words asked for were inserted in the sale conditions. Our correspondent adds,—"Under the circumstances, I have decided to employ a solicitor rather than accept a free conveyance for the lots purchased." It is one thing to buy an orange, another to buy real property. When obtaining possession of a 30*l.* plot for 3*l.* deposit, it may seem scarcely worth while to trouble much about the title; but after building a house, say at a cost of 300*l.*, it would be awkward to discover a flaw as to land-tax or tithe, or other charge; or, after paying regularly the instalments four or five years, anxiety might arise as to the then position of a nominal vendor to convey, or possible foreclosure by a first mortgagee over the entire estate, never properly released. However small the purchase, we recommend caution.

ARCHITECTURAL SOCIETIES.

Glasgow Institute of Architects.—A meeting of the Glasgow Institute of Architects was held on the 12th inst., Mr. John Honeyman, president, in the chair. Messrs. A. J. Williamson, St. Vincent-street, and J. A. Morris, Ayr, were admitted as members of the Institute. Messrs. John Burnet, I.A., and James Thomson, I.A., were reappointed trustees of Haldane's Academy of the Fine Arts for 1881-82. Mr. Honeyman, president, and Mr. Sellars, vice-president, were appointed delegates from the Institute to attend the General Conference of Architects to be held in London next month.

Edinburgh Architectural Association.—At a meeting of this Association held on the 13th inst., Mr. J. Rankine, advocate, read a paper on "The Law of Building Restrictions contained in Feu-rights and in similar Conveyances of Urban Property." Mr. J. M'Lachlan, president, occupied the chair, and there was a good attendance. The lecturer observed, in the outset, that what was done for the law of Rome by the conflagration in the time of Nero was done for the law of Scotland by the erection of the New Town of Edinburgh, and the law of buildings had grown up and developed on account of that, and at an even pace with the growth and development of the metropolis. With regard to the position held by these restrictions in the general law of ownership, it was shown that they formed part of the law of neighbourhood, depended wholly on practice or agreement, controlled the owner's natural power of disposal, independently of any limitations incident to the amount of his estate, as less than fee-simple, and of his obligations to the Crown and the public, independently also of the law of nuisance and servitude, and of the statutory regulations of local or civic government. The leading questions relating to the validity, constitution, interpretation, and enforcement of these restrictions were answered almost exclusively by a *résumé* of the cases which have arisen in the city of Edinburgh since the middle of last century. The area now covered by St. James's-square, Princes-street-gardens, St. Andrew-square, both on the north and south side; its rival, Charlotte-square, St. Andrew's Church, the three houses at the corner of Queen-street and St. David-street, the tenement at the south-west corner of Great King-street and Dundas-street, Carlton-terrace, Charles-street, Wemyss-place, India-street, and other localities of the city, were all shown to have contributed to this branch of the law.

GAS SHAREHOLDERS AND THE ELECTRIC LIGHT.

Mr. Robert Rawlinson, C.B., speaking on the 13th inst. at the half-yearly meeting of the London Gaslight Company, said the shareholders need not be alarmed at the progress made by the electric light, nor think that gas would necessarily decrease in value. The electric light acted as a scare to those who did not know what was going on, and this was just what was wanted, as the gas shares would be bought up by other people as soon as the scare had made them go down low enough. In a short time, power would be asked for in Parliament to enable corporations throughout England to allow any persons proposing to introduce electricity into the public streets and highways to break up streets and roads for the purpose of laying the cables necessary for the electric light. He had private information of this, and he told them of it lest, if it came upon them unawares, they might think there was something very serious in it and that it would imperil their interests. So far from this being the case, however, he believed that all this movement in electric lighting would absolutely result in an advantage to them. It would put manufacturers of gas upon their mettle, and compel them to make their gas of the best possible quality, while managers of gasworks would be compelled to see that the best fittings were used. This was an important point, as the fault lay a great deal more than they were aware of in the carelessness with which the fittings were put in, and also somewhat in the carelessness of purification. One result might be that the gas companies would find it to their benefit to absolutely take charge, as it were, of the fittings, and to employ inspectors to go round and see that they were properly done. This would result in greater economy and a better light to the mutual advantage both of the consumer and the shareholder. Electricity would doubtless accomplish considerably more than it had yet done, but at the same time, he did not think it would interfere seriously with the profits of gasmakers if they were true to their own interests. Neither candles nor oil had disappeared, as had been expected, before gas, but had had a very great increase of sale, owing to the progress of civilisation. He could give numerous instances of a similar nature, and he was confident that not the decrease but the increase in the value of gas would be the result of the advance of the electric light.

National Health Society.—The committee have arranged for the delivery of a series of drawing-room lectures at 23, Hertford-street, Mayfair. This is the programme:—

Friday, April 22nd.—Professor Fleeming Jenkin, F.R.S. "Sanitary House Inspection."

April 29th.—Dr. Robert Farquharson, M.P. "Health in Public Schools."

May 6th.—Mr. C. N. Cresswell. "Sanitary Relations of Local Self-Government."

May 13th.—Mr. Henry Power, M.B. "Care and Education of the Eye."

May 20th.—Dr. Siemens, F.R.S. "Stoves and Grates."

May 27th.—Mr. Ernest Hart. "Recent Progress in Health Knowledge."

OBITUARY.

Mr. J. B. Watson, Architect.—Mr. John Burges Watson, we hear with much regret, died on the 10th inst., at "Carondolet," Hornsey, in the 79th year of his age. He was a pupil of the late Mr. William Atkinson, was one of the founders of the Architectural Society, and some time a Fellow of the Institute. Mr. Watson commenced practice in the year 1825, when Grecian architecture was in vogue, and never subsequently identified himself with the Gothic revival. The National Provincial Bank of England, in Bishopsgate-street, recently taken down; Hook, Holmwood, and Staines churches; a few parsonages, and some private houses, were his principal works. He was for forty years surveyor of the Pentonville Estate. He was a charming water-colourist, and something of a musician; he had a good knowledge of trees, and delighted in landscape gardening. The bent of his taste was for rural subjects, as is shown in the little cottage for the Ornithological Society of London, in St. James's Park. Some years have passed since we last saw Mr. Watson; but we have pleasant remembrances of his kindliness and geniality.

Dr. William Hardwicke.—We record with regret the death of Dr. Wm. Hardwicke, the coroner for Central Middlesex, which took place at his residence, Richmond Villa, St. Mary's-terrace, Paddington, on Good Friday. The deceased on the previous day had some fifteen inquests fixed for his day's labours, and after he had disposed of seven cases at the Islington Coroner's-court, Holloway-road, he complained of feeling faint, and was taken home. The deputy coroner, Dr. Danford Thomas, who resides close by, was called in, and he found that his patient was in an insensible condition, upon which Dr. Buzzard, of Grosvenor-street, was called in, but Dr. Hardwicke gradually sank, and died at twenty minutes past two the following morning, death being due to a rupture of a blood vessel on the brain. The deceased gentleman held the position of coroner for Central Middlesex for six years and a half, succeeding the late Dr. Lankester, under whom he served for twelve years as deputy coroner. He was an intelligent sanitary reformer, and it was largely owing to his exertions that specially-planned coroners' courts were erected in different parts of the metropolis, meeting (though only partially up to the present time) a long-needed want.

The Rev. Prebendary Burgess.—The Rev. Richard Burgess, B.D., one of the prebendaries of St. Paul's Cathedral, who died a few days ago at Brighton, at the advanced age of eighty-four, will be remembered by many of the inhabitants of the metropolis, but more especially by those of Chelsea. He was for some time English Chaplain in Rome, and was subsequently, for a period of thirty-three years, incumbent of Upper Chelsea. In 1869 he was presented to the valuable Crown living of Homingsworth-with-Ickworth, near Bury St. Edmunds, which had fallen to the gift of the Prime Minister, Mr. Gladstone, through the preferment of the Rev. Lord Arthur Charles Hervey, D.D., to the Bishopric of Bath and Wells. The deceased took great interest in antiquarian and archæological studies, and for many years in succession, almost without a break, he contributed a paper on Rome to the Proceedings of the Royal Institute of British Architects. Among his published works are included a treatise on the ancient Ludi Circenses, and a valuable work on "The Topography and Antiquities of Rome." He was an honorary member of the Royal Institute of British Architects, and a corresponding member of the Pontifical Archæological Academy in Rome.

WEEKS'S HYDRO-CALORIC COIL FOR WARMING AND VENTILATING.

The well-known horticultural builders, Messrs. J. Weeks & Co., of King's-road, Chelsea, have just now perfected a newly-arranged coil for warming and ventilating, in one operation, every description of public or private building. A description of it has been before us for some time, but we have a prejudice in favour of seeing things for ourselves, and prefer to delay notice rather than speak at hap-hazard.

The apparatus in question is simple and efficacious. It resembles an ordinary hot-water coil, except that the pipes are vertical instead of horizontal. Through every one of its pipes another, and, of course, smaller, pipe is passed. Instead of ordinary hot-water pipes we have an air-pipe within a water-pipe, the air-pipe being open at the ends and projecting above the water-pipe, which is, of course, closed. The next step consists in uniting all these air-pipes into one beneath the coil, and carrying this one under the floor and through the wall, so as to feed the air-pipes with air from without. The air, it will be seen, can only enter by actually passing through the whole length of the hot water-pipes that constitute the coil, and the water in these pipes becomes a kind of "water-jacket" to the air-pipes. It will thus be seen that the air is drawn directly from without, and in passing into the building is compelled to absorb heat from the water-jacket. During our observation of the action of the apparatus, the rate of movement was such that 32 cubic feet per minute were drawn in and distributed, and the temperature of the air as it left the pipes was 128 degrees. A feature of the operation of the apparatus is that the air acquires in passing through the pipes a salutary velocity of movement which carries the heat in all directions.

The patentees justly claim for their new coil that, as a mere hot-water coil, it exposes one-third more surface than any other coil of the same size; that it brings in fresh air, and warms the air of the room at the same time, without prejudice to either; that it is a good vapouriser; that it is a good air-cleanser, a filter being introduced; and that there is no draught with it, although the ingress of air is great.

THE KYRLE GRATE.

Amongst the contrivances for burning anthracite coal recently put forth, is one manufactured by the Coalbrookdale Company, and lately on view at the Building Exhibition in the Agricultural Hall. We mentioned it in our notice of that collection, but being asked for some additional particulars, add a few words on the subject. It is called the "Kyrle" Grate (Parker's patent), we presume in deference to the society of that name, which, in conjunction with the National Health Society, has been instrumental in bringing the subject to the front. One important advantage appears to be the adaptability of the principle to any grate; the one shown has the appearance of an ordinary open fire-grate of the form familiarised to the public as the Country Bar Grate, but called by the Coalbrookdale Company the "Ironbridge Grate." The improvement lies in the back arrangement, which is, however, very simple. A hole, about 10 in. by 2 in., is made in the bottom of the brick just above the solid bottom of the fire, which aperture communicates with a supplementary flue at the back, the draught draws through the lower part of the fire into this supplementary or back flue, whilst the upper portion of the fire draws through a small aperture in the top plate, which occupies the place of the usual register door. The two flues meet just above this point, and join the chimney proper; thus a high degree of temperature is raised and maintained, a damper at the top regulating this, and a sliding blower in front, which, however, is only necessary when the fire is in process of lighting.

Although no smoke arises from the combustion of anthracite, a certain amount of carbonic oxide is generated, and to consume this within the grate, and prevent its escape into the room, a provision is made whereby a certain modicum of air is introduced through the ashpan, under the bottom brick, which, combining with this carbonic oxide, burns in the back flue. The patentee claims to have produced a smokeless open fire-grate, an economical user of anthracite and of what is now in large places regarded very much in the light of refuse,—gas coke.

CONFERENCE: ROYAL INSTITUTE OF BRITISH ARCHITECTS.

Sir,—As the sub-committee having charge of the arrangements for the meetings set apart for the discussion of architectural competitions, may we, through the valuable medium of your paper, inform your readers that we shall be glad to receive suggestions for discussion and also the names of gentlemen desirous of taking part in the same?

Any communications addressed to us will receive careful consideration.

Cole A. Adams, Fellow,
14, Holden-terrace, Grosvenor Gardens.
Thomas Porter, Fellow,
8, Victoria Chambers, Victoria-street.

A CONTRACTOR'S CLAIM FOR "EXTRAS" ON NEW BUILDINGS.

ARBITRATION CASE.

An arbitration inquiry of long standing, arising out of the building of the new infirmary at Lambeth, has just been brought to a close. Mr. Taylor, who was the contractor for the building, which has already cost upwards of 50,000*l.*, some time since made a claim against the Guardians for no less than 6,000*l.* over and above the amount of the contract which he had made with the Board, in respect of "extras" not included in the terms of his contract. The Guardians disputed the claim, and the case was referred to arbitration, Mr. Stevenson, architect, being appointed the arbitrator. The settlement of the dispute has stood over for upwards of twelve months in consequence of the illness of the arbitrator, but that gentleman has just made his award, which is unfavourable to the contractor, Mr. Stevenson having awarded him the nominal sum of 13*l.* only, instead of the 6,000*l.* claimed. It is stated that the bulk of the costs will fall upon the contractor.

THE EMPLOYMENT OF A QUANTITY SURVEYOR AS A CUSTOM.

BIRDSEYE *v.* THE COMMISSIONERS OF THE DOVER HARBOUR BOARD.

This was an action in the High Court, before Mr. Justice Manisty and a special jury, brought by a quantity surveyor against the defendants to recover the sum of 76*l.* 5s. for fees. The plaintiff relied on an employment by the defendants' architect, and on a custom in the building trade that when a builder or contractor did work, the architect had a right to call in the assistance of a quantity surveyor, to be paid by his employer. The defendants denied any contract and employment, denied the custom, and said it did not apply to this case.

It appeared that in April, 1878, a Mr. Adcock had agreed to take certain land of the defendants at Granville-gardens, Dover, and to build there certain waiting-rooms, refreshment-rooms, and baths. He was to lay out the residue in gardens and pleasure-grounds. By June, it became necessary, as the buildings and gardens were nearly completed, that they should be measured up and the amount ascertained. Thereupon the plaintiff was employed and rendered the services sued for in the present action. Mr. Adcock was to be paid for any expenditure he was put to beyond 350*l.* by the Board; and the large sum of 4,150*l.* was alleged to have become due to him. The greater part was paid off, but there remained a balance of 1,005*l.*, and this was reduced by a compromise made with Mr. Adcock by Mr. Finnis, a member of the Board, to 700*l.* on November 4, 1878. Mr. Adcock stated he was induced to accept the lower sum on the condition of the Board's paying the professional charge,—*i.e.*, the solicitor, the architect, and the surveyor. The plaintiff sent in his account to the Board on January 13, 1879, but Mr. Stilwell, the solicitor and registrar, replied the next day that the Board knew nothing about it, and had never authorised the employment of the plaintiff. The following day the plaintiff again wrote:—"Mr. Adcock informed me the Board had agreed to pay my account direct, or I should not have sent it to you." The matter thus slumbered till October, when Mr. Adcock wrote to the chairman, "May I ask you to pay Mr. Birdseye's account, as it was agreed by Mr. Finnis with me when the compromise was effected that the Board should pay the surveyor?" To this Mr. Stilwell answered, "The Board knew nothing about it, and the plaintiff was so informed as far back as January of this year (1879)." Nearly a year elapsed before the plaintiff issued his writ after this. For the plaintiff, several architects and surveyors were called, who spoke to the custom of the building trade, that in any large matter, say over 2,000*l.*, the architect was entitled to call in a quantity surveyor, to be paid by the employer. For the defendants there were called Mr. Stilwell, Mr. Finnis, Mr. Humphreys, Mr. Pearce, and Mr. Court, members of the Harbour Board, who were present at the meeting of February 5, 1878, when Mr. Williams, one of the plaintiff's witnesses, was there. The plaintiff's name was not mentioned as a man to be employed. Mr. Finnis said he had told Mr. Adcock the Board would pay the architect, but he did not see why the architect should not pay his own surveyor. He was only advising Mr. Adcock to accept the compromise of the 700*l.* He had always denied that he promised to pay the plaintiff.

His Lordship, in summing up, said the evidence of a direct contract to employ the plaintiff was not so satisfactory as, perhaps, the jury might desire. But the great question was whether they thought the custom set up had been proved,—viz., whether in a work of this magnitude the architect or contractor had a right to call in to his assistance a quantity surveyor, whose services the employers were to pay for. Mr. Adcock appeared to fill the double part here of contractor and tenant under the defendant Board, and that, perhaps, accounted for the plaintiff being left out in the cold when payment was made. And the second question would be, had Mr. Adcock accepted the 700*l.* on the assurance that he would not have to pay the surveyor, but that the Board would do so?

The jury promptly returned a verdict for the plaintiff for the amount claimed.

Mr. M'Intyre asked for a stay of execution in order to move the court. He and his learned junior both entertained a strong opinion that custom did not arise in this case, and that the contract alleged had not been proved.

His Lordship.—You may entertain a strong opinion, but you see this man has done the work, and he ought to be paid. I will not assist the defendants in any way. The learned Judge then, on the application of counsel, certified for a special jury.—*Times.*

THE PRESIDENCY OF THE INSTITUTE.

Sir,—You have wisely abstained from making the differences of opinion in the above question a subject of public discussion. In the present letter I desire only to advert to the fact that, in the opinion of many Fellows (who decline to hamper their independent action by joining any committee), the point at issue is not a personal one, as suggested by Mr. T. R. Smith, but is rather one of principle.

Mr. Street has declined to take advantage of the new by-laws, through which he would have been nominated as President this year, and eventually have occupied the chair without opposition.

Mr. Street's personal sacrifice to the best interests of the Institute has animated those who sympathise with his desire to rescind the said by-laws to obtain his consent to his nomination.

The retirement of Mr. Lewis has opened the way for his introduction without postponing the just expectations of others. Consequently, the election of Mr. Horace Jones means to us the perpetuation of a system of election obnoxious to a large number of Fellows, few of whom fully comprehended the scope of its provisions on its introduction.

The election of Mr. Street means to us the abrogation of those laws, or, at least, their suspension, until revised and amended.

The exceptional position of Mr. Street undoubtedly stimulates our desire to see him President, his Royal Academy lectures having proved his teaching power, and his real interest in professional education; but his personal fitness is not now in question: that is admitted. His claim to election is on the ground of his representation of the principle of freedom of election, the re-establishment of which many of us feel to be of higher importance to the permanent interests of the Institute than any personal consideration.

Perseverance in the logical application of the existing by-law is the virtual exclusion of Mr. Street and other distinguished men from the office of president, if not altogether, at least for many years to come,—a state of things from which it is the duty of the Institute to relieve the council, if the just influence of that body is to be maintained over the rising architects of the day. Edwd. C. Robins.

Sir,—There appears to be much misapprehension as to the working of By-law 26 in the nomination of candidates for the office of President of the Royal Institute of British Architects. Many seem to believe that the nominee of the Council, if not deliberately chosen, at least carries the general vote and sympathy of that body, and that to oppose his election by nominating some one else is to run counter to their express advice and wishes. Now, so far from this being necessarily the case, the exact reverse may happen under the present system. The Council are compelled by the by-law to nominate the senior vice-president, and failing him, the next, and so on in rotation; whatever may be their opinion as to the superior claims and fitness of any one else, however strong and unanimous that opinion may be, and however exceptional and peculiar the circumstances, they are absolutely powerless, and have no means or opportunity of conveying their views to the general body of the Institute. Under these circumstances, and in the firm belief that a by-law imposing such restrictions is directly opposed to "the true intent and meaning" of the Charter of the Institute, I have taken care in the present instance to assert my right openly to express an independent opinion. I do not hesitate, therefore, to say publicly that, although a member of the Council which has, under the compulsory terms of this by-law, nominated Mr. Horace Jones, I do not think him, at the present juncture, the fittest candidate for the office of president. Personally, I have no feeling but what is friendly towards Mr. Jones. I fully recognise his claims (under the by-law), and his position in the profession, but apart from all personal feeling, claims, and interests, which surely ought not to enter into a question of this kind, I think that the Institute would make a very grave mistake were it any longer to pass over Mr. Street, who is universally admitted to be the first architect of the day, and, as such, the proper man, in my opinion, to be our next President. I hear rumours of his being asked to withdraw. I hope and confidently expect he will do nothing of the kind. He is pledged to his supporters (to myself among the number) to stand if nominated and to serve if elected, as I sincerely trust, for the interests of the Institute and of the profession, he may be. If every one will vote according to his honest conviction of what will be most conducive to those interests no one can quarrel with the result.

Arthur W. Blomfield.

⁂ A letter from Mr. William White, F.S.A., on the same side of the question, reached us too late for publication.

Sir,—Every well-wisher of the Institute will regret and deprecate the division and contest which have been brought about, and which if persevered in to the end, cannot fail to do harm, by driving away from the meetings in dudgeon a certain number of members. My intention is to support the House-list sent out by the Council, in which Mr. Horace Jones is named for President, in accordance with new laws solemnly agreed to by the body, and of which the written record is scarcely dry. I have been told, but can scarcely believe, that some of the Council intend to vote against their own recommendation. This, it seems to me, would be betraying their constituents. Do they intend to do the same in respect of any of the gentlemen they have named to constitute the Council? They would thus be introducing a mode of conducting the business of the Institute the result of which could scarcely be foretold.

A One-while Member of the Council.

Sir,—I send you a letter from myself to Mr. Street, and his reply, on the subject of this unfortunately contested question of the Presidency of our Institute. My only wish has been to clear the way, if possible, for the usual honourable election by acclamation, rather than by voting. C. F. Hayward.

"Arts Club, Hanover-square,
April 14th, 1881.

My dear Street,—It is with great regret that I, in common with many others, find a contest impending as to the Presidency of our Institute, and I feel this particularly as a consistent supporter of your name for many years, and because I always expected that the offer of the honour would be by a hearty and unanimous vote, to which your are surely entitled. I think no such thing as a contest (at least when there is no matter of principle at stake) should accompany our presidential election.

As an objector, from the very first, to those absurd rules of Council—(not the less so because freely agreed to by the Institute at the time, notwithstanding all that we objectors could say)—I cannot be particularly anxious to sustain them, and yet I feel that the upsetting of the Council as a body, by the Institute members, on such a point as this of President, would be entirely misconstrued, at least by the outside public, who lose no opportunity of abusing the profession. It would give them a chance of saying we are divided against ourselves.

The honour of the position, too, is taken away, in my idea, if the President is to be one of a party or a majority.

My only idea of your own wishes is gained from a circular signed by Edis & Spiers, which I have not answered, as I felt that it was well known I was a supporter of yourself, long before they could have moved in the matter; and this, perhaps, is the reason why I have heard so little about it now.

I fully appreciated your retirement two years ago, rather than be a President by succession; so the whole thing seems to me now to be a blunder, owing to these Council rules, though I hope some way out of the difficulty may be found without a contest

The nomination of our good friend, Horace Jones, the City Architect, by the Council, having gone forth, it can scarcely be withdrawn now, though I am told Mr. Jones was willing to stand aside in your favour before the nomination, rather than provoke a contest.

We can all admire Mr. Jones's talents, and appreciate the large works he has carried out, while not a few will feel that he has been a staunch friend to the Institute and the profession. But this only makes it more difficult to insure at this moment the unanimity with which we should offer the Presidency to Mr. Street, and I may add the more painful as setting one good man against another.

So there seems but one way out of it all, viz., to ask you, for the dignity of yourself and the profession, to allow the action of the Council to stand unchallenged for this year, on the distinct understanding that the rules may be reconsidered immediately with a view of leaving the choice of President quite free and unfettered (except, say, the suggestion of some name by the Council after receiving nominations from without), so that at least the idea of succession by seniority be for ever abandoned. We can then pledge ourselves anew, and bring you in with something like professional unanimity in 1882.

Excuse my writing so freely, but I hope I may do so as an old professional friend as well as one who has often personally experienced your kind and friendly feeling as a brother architect.

Although I cannot call this a private letter, I should not think of publishing it without your consent, which I ask; but I intend to show the substance of it to any who should confer with me as to our course of proceeding under our present complications.

Requesting your early reply, if convenient, and permission to print this my letter, I am, very truly yours,

Chas. Forster Hayward.

G. E. Street, Esq., R.A."

"14, Cavendish-place, Cavendish-square,
April 19th, 1881.

My dear Hayward,—Thanks for your letter on the subject of the Presidency of the Royal Institute of British Architects. I think you do not quite understand the state of the case. In compliance with the request of some of the members, I promised that, if I were nominated to the office and elected, I would serve, and I cannot now retract that promise.

The nomination of the second vice-president is (as is stated on the voting paper) a formal and unavoidable act of the Council under the By-laws, and not the expression of the unanimous wish of the members. The same by-laws provide expressly for the nomination of men who are not of the Council, and not vice-presidents at the time of nomination. Four years ago the Council nominated Mr. Ferrey, myself, and Mr. Horace Jones (in this order) for the office of Vice-president, it being well understood that whoever came out highest in the voting would be the next President. It was, therefore, a distinct election for the President's chair.

Some members not of the Council thought that Mr. Whichcord, who was one of the outgoing Council, ought to have been nominated as Vice-president, and accordingly they added his name to the list. No objection was taken to this course, which was almost absolutely identical with the action to which you see some objection now, and on the ballot Mr. Whichcord had the greatest number of votes; I was second, Mr. Ferrey third, and Mr. Horace Jones was not elected. Mr. Whichcord succeeded to the Presidentship without a word of objection from any one. He was the choice of the members, and in every way a good choice, and he justified the action of those who substituted his name for those put forward by the Council. I have never heard that the profession suffered in consequence in public esteem, and am sure he has been cordially recognised as the head of the whole body, and not as the representative of a party. My position was, however, a somewhat unsatisfactory one. It seemed to me from the first that it would be quite impossible that I should take the Presidentship by right of succession, when the Institute had shown by its election of some one else before all of us that it did not approve of the Council nominees for the Vice-presidentship and (under by-laws) consequently for the Presidentship, and I felt that I was bound to retire from the Vice-presidentship upon the first convenient opportunity, in order that the members might be quite free to elect the best man to follow Mr. Whichcord. I have not the slightest feeling of antagonism to Mr. Horace Jones. We are good friends now, and there is no doubt that we shall continue to be so in the future, whatever the result of the election may be. As to his offer to retire in my favour to which you allude, I need not say that what he said in a letter to the Council, of which he was good enough to send me a copy, was that he "would withdraw in my favour if I desired to stand in Professor Lewis's position as senior Vice-president, and if I should intimate my wish to become president in the ensuing year." This is precisely what I could not do; I had no wish in the matter. It is for the members to express a wish as to who should be President, and I had no reason to suppose that their wishes would lead them to nominate me. You see, then, that my position is a peculiar one. I am the person that, when the order of presidents was settled by an election four years ago, was placed next in succession to Mr. Whichcord and above Mr. Horace Jones. But, feeling that I could not possibly take the Presidentship on the strength of such election in justice either to the Fellows or myself, I retired. Since that time I have been absolutely passive on the subject. But I have always felt that it would be an honour to be elected to the office, and when I was asked by a member of the Council whether I would serve if elected, I had no hesitation in agreeing to do so on this occasion. I cannot possibly accept your advice that I should now withdraw, and leave the opponents of the by-laws in the lurch upon the understanding that a future meeting is to alter these laws and a future election is to take a certain course. No one has, or ought to have, any power of arranging such understandings. I prefer to allow matters to take their course. If it appears that I am now considered to be a fit person to be President, I am willing to serve in spite of the many other very pressing calls on my time. If, however, for the second time my candidature is unsuccessful, you will hardly be surprised at my saying that I shall not again allow my name to be brought before the Institute.

George Edmund Street.

C. Forster Hayward, Esq., F.R.I.B.A."

NEGLIGENCE AS TO A SEWER BY A CORPORATION.

FLEMING v. THE CORPORATION OF MANCHESTER.

This was an action (before Mr. Justice Stephen, Queen's Bench Division, sitting at Guildhall, April 13th), brought by the owner of some house property in Manchester, to recover damages for the destruction of his premises by the bursting of a drain during a violent storm of wind, rain, and lightning:—

The case was tried before Mr. Justice Stephen, at Manchester, when the jury found that the destruction of the house was caused by the bursting of the sewer, which had resulted from defects in its original construction by the omission of the defendants to take reasonable means of keeping it in a proper condition, and not by lightning, as alleged by the defendants. Upon those findings the parties moved for judgment, and his lordship now gave his decision.

Mr. Justice Stephen was of opinion that, as the authorities in the case, the corporation were under a legal duty to use such powers as the statute gave them to keep the sewers in proper order, and from time to time to inform themselves of their condition; that the 14 and 15 Vic., cap. 19, and 11 Geo. III., cap. 47, gave the corporation power to cause the sewer to be cleansed and repaired, and that common law superinduced upon that power a duty to use it, and to use all reasonable means of informing themselves whether there was occasion to do so, and that the finding of the jury showed that they omitted to perform that duty, and so were negligent. He would, therefore, give judgment for the plaintiff for such an amount of damages as should be agreed upon between the parties, but would stay execution until the 5th of June, to allow the defendants an opportunity of moving for a new trial.

Judgment was given accordingly.

CAER PENSAUELCOIT.

SIR,—About four years since I published a dissertation, in which I hoped I had realised the locality to which the above ancient British name belongs. It was a puzzle to Humphrey Llwyd, Camden, Usher, and to all others who had attempted to place it, down to and including Petrie, Stevenson, and Algernon Herbert. The site is shared by the counties of Somerset, Dorset, and Wilts, and my solution soon fell under the fostering care of the Somersetshire Archæological Society, in relief of my own parental charge of it. They appointed a committee of exploration of the site, with Professor Boyd Dawkins and General Lane Fox for assessors, who have been misdirected into a side issue. The result has been two reports, published in two volumes of the Proceedings of the Society. I have drawn up a reassertion of my solution with reference to these reports, but, as the appearance of it in the Transactions of any of the Societies would have been long delayed, I am printing it privately on my own resources, and will be glad to present a copy to any member of the Somersetshire Society, the Bath Field Club, the Wiltshire Archæological Society, the Dorset Field Club, or any similar society, or to any possessor of the original dissertation ("A Primæval British Metropolis, 1877"), to which, indeed, it will be supplementary. A map will also be included, the want of which was felt by some who gave the subject their attention. It will pass under the 4-oz. rate of book postage.

THOMAS KERSLAKE.

No. 14, *West Park, Bristol.*

REPLIES TO QUESTIONS CONCERNING COLOUR.

SIR,—The existence of contraries and of "contrast" is one of the necessary conditions of every fluctuating phase of existence, and consequently of the visual phase as well as of any other; moreover, I have mathematically demonstrated what the measure of that libration or alternation is throughout nature. It is a reaction that takes place in the sensuous system, as well as in the planetary, from any condition in excess of a mean state, to an equal and opposite one in defect, and *vice versâ*. It is the means by which the equilibrium of nature is maintained. This is fully illustrated in my physiological theory of the harmony of colours, a theory which entirely precludes the possibility of entertaining that antiquated figment of the brain, the notion of primaries and of secondaries. However, I am completely in accord with your correspondent in reference to the doctrine of "absorption," a doctrine which is utterly opposed to the general conclusions of modern science. But he, like other writers upon the subject of "light," whilst admitting that colours are merely sensations, from which it follows that colours can have no external existence whatever, save and except as vibratory action, discourses upon them as if they had. This is the fruitful source of confusion in treatises upon the subject. To speak of the "absorption" of one colour and the reflection of another would be simply absurd, even if absorption did take place, for it would then be but an absorption of vibration; and to speak of the absorption of vibratory action would be simply ridiculous. My dissent from the hypothesis of absorption was expressed not only in my "Revised Theory of Light," but in a letter which some time since appeared in your journal under the heading, "Vibration as a Mode of Motion," a letter to which your correspondent shortly afterwards referred.

The instances cited by your correspondent in his letter of the 9th inst. as impugning the principle of contrast,—I am not now speaking of "Chevreul's, or Field's, but of Nature's,—may doubtless be explained without in the slightest degree affecting the integrity of the general principle of contrast,—a principle which is, as we have affirmed, a principle immovably set in the constitution of the Cosmos.

But let us understand this matter of colour contrast. The real contrasts of colour are what are commonly called the complementaries. This is shown by the ocular spectra, which form the true basis of the theory of the harmony of colour. The harmony of colour is a physiological, not a physical, question. An ocular spectrum of black is succeeded on the retina by an opposite one of white, of red by one of green, &c. All questions of colour, as colour, must be decided by the optic sense; if, on the other hand, we desire to determine the subject of contrast on a physical basis, we must do so by a comparison of wave-lengths, &c.

In contemplating the physical scale of wave-lengths, &c., we perceive that three modes of harmony are possible:—1. That of extreme difference, or the harmony of contrast, or compensation; 2. That of moderate difference; and 3. That of likeness, resemblance, or assimilation. Early art adopts the first; mature, healthy art, the second; and decadent, or morbid art, the third. It is very remarkable that the theory of the ocular spectra should be utterly neglected, when it points out how every healthy vision may determine for itself what the true harmonic of any colour sensation should be, without the aid of diagrams or of books. It is a theory which ought to be expounded in all the art schools.

It is curious that, with the endeavour to establish the close analogy of light and sound, the reasonable explanation of a body appearing of a certain colour has never been accounted for as we account for a musical string responding to the note to which it is attuned, and to that vibration only. In like manner, bodies only emit that colour producing vibration to which their molecular constitution is attuned. What becomes of other vibrations is another matter.

W. CAVE THOMAS.

A GRAVE OFFENCE.

"Immortal Cæsar, dead, and turn'd to clay:
Then use his tombstone to repave the way."
Shakspeare, altered.

SIR,—Walking recently through the precincts of Savoy Royal, I was sorry to see a tombstone doing duty as a paving-slab, inscription upwards. I suspected others, only they were the other way up. Sextons ought not be favoured with paving contracts; it is unfair to those who bought the stones. I knew a publican who obtained two from a churchyard, to pave a convenience. I have heard of the village baker who, in conjunction with the grave-digger, lined his oven with some cheap stones, and the plastic dough took impress of angels' heads.

R. T.

HESTON AND ISLEWORTH LOCAL BOARD SURVEYORSHIP.

SIR,—The Works Committee of this Board have recommended that Mr. Smith, their present inspector of nuisances, be also appointed their Surveyor, at the salary of 150*l.* per annum inclusive.

Query, will it not be waste of time for candidates to attend on Tuesday next, as per advertisement?

A. B.

PROVINCIAL NEWS.

Preston.—It is announced that the trustees of the late Mr. E. R. Harris, late prothonotary of Lancashire, who have the disposal of a bequest of over 200,000*l.* for certain charitable purposes generally indicated in the will, have just approved of a scheme submitted by a deputation from the Library Committee of the Preston Corporation for the erection and endowment of a new free library, subject to the sanction of the Master of the Rolls. 60,000*l.* are granted to the building, 7,500*l.* for a reference library, the same sum for works of art, and 15,000*l.* for endowment. An application has been made for a grant towards the endowment of the Preston and County of Lancaster Royal Infirmary. It is reported that the trustees are making grants of a sum of between 25,000*l.* and 40,000*l.* towards the endowment of technical education in connexion with the Institution for the Diffusion of Useful Knowledge, Preston.

Salisbury. — The banqueting-hall which for more than 400 years has stood in the thoroughfare now known as the New Canal, has had a new front put to it from the designs of Mr. Fred. Bath, architect, Salisbury. It is of domestic half-timbered construction, in the late Tudor style. The structure is wholly of well-seasoned oak, the panels in many places being filled in with ornamental plastering known by the name of *sgraffito* work. The lower piers on either side are of Tisbury stone; and resting on sculptured lions is not only the great cross beam supporting the body of the front, but the story-posts as well. The shop-fronts are entirely of oak, richly carved, and with plate-glass windows. Over is the legend, in curious characters, "Ye Halle of John Halle" (the hall having been built between the years 1467 and 1484 by John Halle, a notable citizen). The story above is carried by carved corbels, and the windows, whose casements are rich in tracery, are filled with tinted semi-opaque cathedral glass. The windows in the story above are similarly treated. Between the two stories are projecting figures of John Halle and King Edward IV. These are sculptured in oak, and, corbelled out, serve to carry the once again projecting story-post above. The gable is of steep pitch, and has ornamental barge boards. On the top of the king-post, and standing out boldly and with capital effect against the sky-line, is the carved figure of a bear with the nigged club. All the carved work has been carried out by Mr. Harry Hems, of Exeter. The roofs are covered in with dark tiles. The ornamental plaster, exterior work, embraces panels in *sgraffito* representing the lily and the rose, and diapers of the fleur-de-lis, portcullis, Tudor rose, &c.; but the most interesting treatment is the introduction into this stucco work of the reproductions of the ancient armorial bearings found upon the original stained glass, &c., in the banqueting-hall. This *sgraffito* work has also been carried out by Mr. Harry Hems. The general contract has been carried out by Mr. John Wort, builder, Park Works, Salisbury, under the immediate direction of the architect.

Middlesbrough.—Mr. R. C. T. Hildyard, one of the Inspectors of the Local Government Board, has held an inquiry in the Board-room, South Bank, in reference to an application from the Normanby Local Board for sanction to borrow 1,500*l.* for works of street improvement, and 750*l.* for the purchase of land for market purposes.

DUBLIN.

The New Sewerage Works.—A special meeting of the Public Health Committee of the Corporation of Dublin was held on the 14th inst. for the purpose of inquiring into allegations made by Messrs. Carey and Quaile, who represented that they were a deputation on behalf of certain ratepayers, to the effect that the sewers at present being executed in the city by contract have been improperly constructed, both as regards materials and workmanship. The chair was occupied by Councillor E. Dywer Gray, M.P. The committee having received the report of Mr. Bell, C.E., who had inspected certain of the alleged defects, decided that a further investigation was desirable, and a resolution was adopted that the Council should be recommended to apply to the Local Government Board to hold a sworn investigation into the subject.

Scope for the Electric Light.—The *Freeman's Journal*, urging the adoption of the electric light in the streets of Dublin, says,—"There is no city in the United Kingdom so 'gas-ridden' as our own, or where the citizens would more gratefully receive any relief from the present incubus in the shape of a healthy competition. There is no city more suited for the electric light. O'Connell Bridge, Westmoreland-street, and College-green would look simply magnificent if so illumined. Why do not the Corporation take up this subject, and experimentally light some of our principal thoroughfares as they are doing in London?"

Books.

Horticultural Buildings: their Construction, Heating, Interior Fittings, &c. By F. A. FAWKES. Batsford, High Holborn.

MR. FAWKES loses no time before mentioning that he is a member of the firm of T. H. P. Dennis & Co., of London and Chelmsford, but it is eminently due to him to say that we find in the book very little that looks like personal advertisement, and we believe him when he says that he has honestly sought to treat the subject from an independent, disinterested standpoint. The special value of the work consists in this, that he has endeavoured to ascertain some of the principles which underlie the mechanical details connected with horticultural buildings, and to record the results for the benefit of others. We know of no book which contains so much initial information on the subject and is more likely to lead to improvements. The information and opinions given are better than some of the illustrative designs which accompany them; the draughtsman having been betrayed by the current fashion into the use of small squares, thick sash-bars, heavy frames, stained glass, and other erroneous introductions, against which Mr. Fawkes, as a gardener, would be one of the first to protest. As regards heating, he arrives at the conclusion that the low-pressure hot-water system is the most advantageous for horticultural purposes, and this is treated of at considerable length.

The different systems of mechanical glazing are described and illustrated, but the writer, after all, considers that no system, on the whole, is better adapted for horticultural buildings for growing purposes than glazing with putty when properly performed. It will have been seen that we think well of the book, and we need scarcely add that we cordially recommend it, as well to architects as to those of the general public who wish for the delights of a greenhouse or conservatory, and seek to know what would best suit their requirements.

Miscellanea.

Serious Results of Bad Building.—The Edmonton Local Board, last week, made a vigorous demonstration of authority, from which it is hoped other builders will take warning. It will be remembered that, on January the 13th, a builder, named Joseph Watkins, was summoned before the Justices in Petty Session, which summons was heard on the following Thursday. The charge against him was the violation of the Board's by-laws, in the erection of six houses with improper materials, on an insecure foundation. Evidence was given by the chief surveyor, Mr. Grindle, and confirmed by the sub-surveyor of the particular district, who proved the case to the satisfaction of the magistrates, who fined the defendant 2*l.* 10s. for each house. According to *Mayer's Observer*, however, he took no means to remedy the evils complained of, and on March the 22nd last he was summoned before the Board of Health to show cause why the defective buildings should not be pulled down. The Board fully discussed the matter, and came to the unanimous decision to demolish the buildings, and gave instructions to the surveyor to carry out the order. The work of destruction was commenced on March the 30th, and the premises were razed to the ground. It was then found that no concrete had been placed under the foundation-walls, the foundation simply resting upon the maiden soil, but as a means of deception, the builder had banked some concrete against the other side. On the same day that his buildings disappeared under the fiat of the Board, Mr. Watkins was arrested for the non-payment of the fees and costs, amounting to some 20*l.*, incurred in the litigation, and is now enjoying the holiday of compulsory retirement for a total of eighty-four days, fourteen days for each house.

The Yorkshire Fine Art Institution.—Through the kindness and exertions of Sir Philip Cunliffe Owen, of the South Kensington Museum, the Council of the Yorkshire Fine Art Institution, York, have succeeded in securing the loan of the Prince of Wales's Indian presents, and these have been safely conveyed from Aberdeen, where they were last exhibited, to York, and now occupy the Central Hall and North and South Picture Galleries of the Institution. The presents, which are very numerous, have been placed in position under the superintendence of Mr. C. B. Worsnop, a gentleman specially sent down for the purpose from South Kensington, and are now in charge of Mr. Christie, and will form a very valuable addition to the other attractions of the Exhibition, which will be opened the first week in May.

The New Workhouse Project at Dulwich.—The efforts which have been made by the inhabitants and owners of property at Dulwich to prevent the erection of a large new workhouse in the locality may now be said to have altogether failed. We understand that the St. Saviour's Board of Guardians have decided to proceed with the erection of the building as speedily as possible, and that plans of the intended workhouse are now being prepared by the architect.

St. Alban's Abbey.—Nearly twelve months ago the Chancellor of the diocese granted Sir Edmund Beckett a faculty to restore the west front of St. Alban's Abbey, at an estimated cost of about 25,000*l.* Within the last few days Sir Edmund has accepted the tender of Messrs. Longmire & Burge, who have for some time past been engaged on other parts of the building, for the whole of the work.

National Fisheries Exhibition at Norwich.—On Easter Monday the long talked-of National Fisheries Exhibition was opened in this old cathedral city by the Prince of Wales, who was accompanied by the Princess of Wales, Prince Leopold, and a select party. One very special feature of this exhibition may be said to be the illustration of the aquatic fauna of Norfolk and Suffolk, which is exhibited in a series of aquaria, specially prepared for the occasion, and furnished with live specimens of every known fish indigenous to the local waters, as well also as of those that have been introduced by acclimatisation. Earl Ducie, Viscount Powerscourt, Lord Lovat, Mr. Spencer Walpole, Professor Huxley, and Mr. Calcraft, the permanent secretary to the Board of Trade, are the commissioners; and, in addition to a large number of special money prizes, are empowered to award Government gold, silver, and bronze medals and diplomas of honour. One of the most interesting of the general exhibits is the three show-cases of Messrs. Samuel Allcock & Co., the well-known fishing-tackle manufacturers of Redditch, which are devoted to specialties required in the piscatorial art, and contain, indeed, a complete series of angling equipment, —of everything, in fact, as it has been amusingly and graphically remarked, that a fisherman, or fish either, unless a very fastidious fish, could desire.

A Grate for Anthracite. — The best arrangement for burning anthracite coal in dwelling-houses, by the use of which much smoke would be avoided, is eagerly looked for. Messrs. Archibald Smith & Stevens, of Leicester-square, are introducing a grate for this purpose, which certainly deserves to be inquired into. We have seen it in action, and the anthracite can be burned in it either with a sharp draught or a slow draught, at will,—a great advantage. The grate, or basket, swings on an axis, being balanced by two weights, so that its capacity can be enlarged or reduced at pleasure. It forms a kind of hopper at the end of a long, flat, curved pipe. This pipe is charged with anthracite in the morning through a door, and contains enough fuel to last twelve or fourteen hours. From the grate rise two flues. In the front-flue is a damper worked by a convenient handle. By closing this damper the products of combustion are compelled to flow downwards through the anthracite in the grate or basket before getting away. The combustion becomes very rapid and the heat intense. When slower combustion is required the damper is opened, and the action is then that of any ordinary house-fire. It seemed to us to act very completely.

Society for Photographing Relics of Old London.—This society is pursuing its course steadily and well. The present year's issue consists of the following subjects:—Two views of King's Head Inn-yard, two of White Hart Inn-yard, George Inn-yard, two of Queen's Head Inn-yard,—all in Southwark; Old Houses in Borough High-street, St. Mary Overy's Dock, Old Houses in Bermondsey-street, Sion College, London-wall, and Oxford Market. Some of them are not very interesting, but that very fact proves the value of the society, since it is only through its means that memorials of such sites would be preserved. A valuable addition has been made to the series of photographs given for the amount of the subscription, in the shape of a sheet of descriptive letterpress to accompany them. Sheets have also been prepared for each of the back sets. The photographs are produced by Mr. Dixon, of 112, Albany-street; and Mr. Alfred Marks, of Long-Ditton, Surrey, will give any information that may be desired concerning the Society, the support of which is certainly to be recommended.

Gateshead.—Sir: The Guardians of Gateshead (in spite of their advertisements for plans in competition) are hotly discussing a scheme for purchasing land for an entirely new workhouse at the cost of fifty or sixty thousand pounds, in order that they may introduce "spade husbandry" for the employment of able-bodied paupers. Their present house is in a woeful state of inefficiency.—Clerk.

Proposed New College for Dundee.—It is stated that negotiations on behalf of Miss Baxter are in progress for acquiring a site for the proposed new college. The site thought of is about three acres in extent, and lies between Small's Wynd and Park Palace, and has a frontage to the Nethergate. There are various properties on the ground, including St. John's Free Church.

Manganese Bronze.—The Lords of the Admiralty have ordered the *Colossus*, now in course of construction at Portsmouth, to be fitted with a manganese bronze propeller, in place of the one of gun-metal originally ordered. This decision has been arrived at after a series of comparative experiments made with the two metals in the presence of Mr. Farquharson of the Admiralty, at the works of Messrs. Maudslay, Sons, & Field, the contractors for the engines. Bars of both metals, 1 in. square, were placed on supports 12 in. apart, and first subjected to a steady pressure applied in the middle of the bars, and afterwards to impact by a weight of 50 lb. falling from a height of 5 ft. With a steady pressure the gun-metal bars slipped between the supports or broke with a strain of 28 cwt., while the manganese bronze bars required 54 cwt. to break them. Tested by impact, the gun-metal bars broke with from seven to eight blows, while it took from thirteen to seventeen blows to break the manganese bronze bars. The ultimate bend of the latter was also in both cases more than that of the gun-metal, thus showing fully double the strength with superior toughness.

Fall of a Church Tower.—On the evening of the 14th inst., a few minutes before ten o'clock, the north-west corner of the tower of St. John's Priory Church, Chester, from base to summit, fell with a tremendous crash, bringing down about 600 tons of masonry, and completely crushing the fine porch entrance to the church. The tower is of great antiquity, and from time to time for many years past it has undergone repair, and similar work had been in process, it is stated, within a few days of the catastrophe. Some years ago, says a local paper, the tower was practically condemned by an eminent architect, who forbade the ringing of the bells. Certainly the appearance of the venerable pile, which is familiar to all visitors to Chester, and to many who have never looked on it (for it has been the subject of hundreds of paintings and sketches), has for a long time been anything but secure, and wonder is freely expressed that it has not come down altogether ere now. It is believed that no one was injured. A further portion of the tower has since fallen.

Proposed Cathedral for Douglas, Isle of Man.—It is stated that Mr. John Pitt Bayly, architect, of London, has supplied the designs for the proposed cathedral at Douglas, Isle of of Man. The building will be of Early English character, cruciform in plan, with two towers and spires at the west end. It will consist of nave, aisles, transepts, chancel, and choir also with aisles; bishop's, clergy, and choir vestries, and chapter-house, hexagonal in form. The organ will be placed in the north transept, and the seating of the nave and transepts will be by chairs. The cathedral will be entirely of stone, selected by Mr. Bayly from the local quarries; externally, this will be laid in irregular courses, but in the interior the stone will be wrought. All the ribs of the vaulting to the choir, aisles, and chancel will be of stone, while the ribs of the nave will consist of richly-moulded oak. The towers will not have any dials, but there will be ample arrangement for chimes. The cost will not be less than 25,000*l.*

Science and Art Department.—A report has been issued, as promised by Mr. Mundella last session, on the system of circulation of art objects on loan for exhibition, as carried on by the Science and Art Department, South Kensington, from its establishment to the present time. During last year, 5,217 objects and 5,872 pictures in frames were sent out from the parent museum to local exhibitions. Private owners have been encouraged to follow the example of the South Kensington Museum. It is believed that not fewer than 170,000 loans of examples of fine and industrial art have thus been made by private owners to the various art exhibitions with which the Department has been connected since 1854. Detailed information as to the loans of the Department is given in a number of appendices to the report.

The Italian Opera House.—Mr. Gye has spared no expense in making this building as safe as possible against fire. In addition to the tanks on the roof, Messrs. Merryweather have fitted a high-pressure main with hydrants in the building. This has a constant service from the New River supply. There is also a large supply of the new London Brigade hose, hand-pumps of the Brigade pattern, also "extinctors," fire-buckets, &c. There are four firemen on duty, and we hear that Mr. Gye is about to drill others of the staff in fire extinguishing.

Pictures at Liverpool.—The Art and Exhibitions Sub-Committee of the Corporation of Liverpool, in their Report of the Tenth Annual Autumn Exhibition of Pictures, which was opened on Saturday, September 4th, and closed on Saturday, December 4th, 1880, state that in the three months during which it was open to the public there were 28,991 visitors at one shilling, 10,969 at sixpence, and 35,198 at threepence. Out of 3,128 pictures and other works of art contributed, only 1,081 were exhibited, and of these 271 were sold for various sums, amounting in the aggregate to 11,753*l*. 7s. 6d. The sales thus effected are, with the exception of those in 1875, very far beyond the average. The following pictures have been purchased by the Corporation, for the permanent collection, out of those in the Exhibition, at a cost of 1,427*l*. 10s., which includes the balance of the "Picton Fund," viz.:—"Down in the Reeds by the River," Frank Walton; "Moorland, Barmouth," Albert Hartland; "The Village Lawyer," Carl Schloesser; "Sunday Morning," J. Campbell Noble, A.R.S.A.; "One of the Family," F. G. Cotman; "Blanchisseuses," Miss A. Havers; "Weal and Woe," C. Gregory, Picton Fund; "Table d'hôte at a Dogs' Home," J. C. Dollman, Picton Fund. And an important work by Gustave Doré, entitled, "The Flower Sellers," was presented to the Corporation by Mr. Henry Thompson, junior.

Dunwich.—Mr. Arthur C. Pain writes:—"On Easter Monday I paid a visit to the remains of the ancient city of Dunwich, on the east coast of Suffolk. Many of your readers, no doubt, have seen the interesting ruins of the monastery and the church of All Saints. As far as I am aware, none of the authors of the histories treating of this ancient city have drawn attention to the remarkable, and, I think I may say, unusual, number of different kinds of stone used in the walls of All Saints' Church. It may, perhaps, interest your numerous readers if I give a list of a few of them as follows:—Rag stone, from the Suffolk crag; flints, black and yellow; cement stones, Kentish rag, lower chalk, millstone grit, basalt, red granite, grey granite, Caen stone, and carboniferous sandstone. With the exception of the three first mentioned, none of the stones are found in the neighbourhood, and many of them must have come long distances by water. Many of the stones show marks of having been waterworn, and I should think it not improbable that they were brought as ballast by the ships which crowded the port of Dunwich prior to the reign of Henry III."

Canvey Island.—The Canvey Island Commissioners have now resolved to take steps towards repairing the river-walls of the island, which were so greatly damaged by the storm of January 18th last, and they have called in Messrs. R. B. Grantham & Son, to survey and report upon the necessary works. The island is situate about four miles above Southend, on the Essex shore of the river Thames, and it is entirely below the level of high water. In ordinary seasons it is a fertile piece of land. The walls facing the river Thames under the Commissioners' jurisdiction extend over a length of three miles, and the gaps made by the storm measured a mile and a half in length. The stonework also was so much injured that the greater portion of it will require replacement. About 1,500 acres were inundated by the bursting-in of the tide in January, and many of the inhabitants of the various farms were compelled to leave their homes.

The Stage.—On Wednesday afternoon, at the Gaiety Theatre, Mr. Chas. Kelly gave a London audience an opportunity of passing sentence upon the dramatised version of Mr. Moy Thomas's novel, "A Fight for Life," as performed by himself and the company he has called to his assistance; and judging from the way the piece was received by a well-filled house, he may feel satisfied with his venture. Mr. Kelly, who played with much restrained power, was most ably and pleasingly supported by Miss Alma Murray, whose performance of the heroine was earnest and artistic. This young lady has made a great advance in her profession, and obviously has a good future before her.

City of London College.—The Council of this institution have obtained a site for the new college building, contiguous to the Moorgate-street Station, and containing upwards of 4,500 square feet. The new college will contain accommodation for about 4,000 students, and should be completed by Midsummer, 1882, when the lease of the premises expires.

Reconstruction of Gas Works.—Writing on this subject, the American *Gaslight Journal* says:—"The present time seems to be a kind of turning-point in the construction of works in this country. The system of heating benches by improved furnaces, either upon the regenerative principle, or some modification of it, is now so well established that future arrangements of retort-house floors must be made to conform to the new order of things. The next important step is the mechanical handling of material. The satisfactory solution of this problem demands such an arrangement of floors that gravitation may be relied upon for motive power to a large extent; and what is most satisfactory in this regard is that the same arrangement of levels suits the deeper furnace, the handling of coke below and coal above, and machines on the retort-house floor for charging and discharging the retorts. To make gas that can be sold at a cheap price, all of these improvements must be made available, and must be so adjusted to each other that the maximum of work can be performed with the minimum of labour. With the reduction in the selling price an increase of business will soon follow, and the smaller proportion of profit per 1,000 ft. will be much more than made up by the large amount of business. Improvements thus judiciously made will surely pay in the end, and the manager who is soonest ready for doing his work properly will be earliest ready to reduce his price and increase his total profits." Some of these observations apply in England as well as in America.

Statuary for Blackfriars Bridge.—No decision has been come to respecting the statuary to be placed on Blackfriars Bridge. The models and sketches which have been sent in competition number nearly fifty, and are at present deposited in a vacant warehouse in Aldermanbury, where they were removed from the Guildhall. The models, which are of clay and plaster, include some very poor things. The official inspection has not yet been made, and no means have been afforded us to review them properly. We might have done it surreptitiously a week ago, but that is scarcely the right way.

Abbotsford House, near Melrose, the well-known residence of Sir Walter Scott, has, it is stated, been let to Mr. Albert Grant. It is understood that this will not interfere with the privilege hitherto enjoyed by the public of admission on certain days to the library and museum belonging to the residence.

Proposed Covered Market at Carlisle.—The attention of the Town Council of Carlisle is about to be directed with earnestness to the question of providing a covered general market for the sale of all kinds of provisions and other commodities. It appears to be a matter of pressing necessity.

City and Guilds of London Technical College, Finsbury.—The laying of the foundation-stone of this college, by his Royal Highness Prince Leopold, has been postponed until Tuesday, May 10, at half-past three o'clock.

The Building Exhibition.—The Bracknell Pottery, Brick, and Tile Company had a good display of bricks, tiles, and other builders' requisites. They also showed specimens of their pottery goods.

"**Hermes.**"—A cast from Berlin of this newly-found statue may be seen at the Gallery of Messrs. Brucciani & Co., in Russell-street, Covent-garden, who have just now moulded it.

TENDERS

For erecting an infirmary for the Guardians of the Croydon Union, for the present accommodation of 432 patients and for the administrative buildings for 643 patients. Messrs. Berney & Monday, architects. Quantities supplied by Messrs. Franklin & Andrews:—

		Extra for Keen's Cement.
Shepherd, Bermondsey	£79,964	£186 !
Morris, Ashurst Wood	73,500	580
Hobbs, Croydon	69,673	1,175 !
Crockett, Camden Town	69,726	490
Dickenson, Loughboro' Junction	67,300	200
Nightingale, Lambeth	66,381	681
Chappell, Pimlico	65,920	350
Hart, Great Dover-st., Borough	65,470	510
Paramor, Margate	65,000	520
Little, Whitechapel	64,150	352
Shaw, Westminster	63,380	640
Bull & Son, Southampton	62,486	574
Longley, Worth, Sussex	62,709	300
Jerrard, Lewisham	62,300	370
Braid & Co., Chelsea	61,965	450
Smith & Sons, South Norwood	61,698	640
Perry & Co., Bow	61,857	450
Howell & Son, Bristol	60,995	379
Garlick, Birmingham	59,370	735
Kirk & Randall, Woolwich *	59,435	260
Martin, Wells, & Co., Aldershot	58,999	250

* Accepted.

For the erection of new railway station hotel, Whitby, for Mr. J. J. Gutch. Mr. Edward H. Smalls, architect. Quantities supplied by Mr. H. T. Neilson:—

Chas. Winterburn, Whitby	£2,671	5	0
Richard A. Raworth, Harrogate	2,280	0	0
John White, Whitby	2,233	0	0
J. Gladstone, Whitby	2,205	0	0
William Barton, Whitby	2,140	11	0
Lowest separate tenders	2,007	9	0
William Langdale & Sons, Whitby *	1,991	0	0

* Accepted.

For premises, No. 17, Coventry-street, Haymarket, for Messrs. L. & H. Nathan. Mr. Henry Vulliamy, architect. Quantities by Mr. Ormes:—

Greenwood & Co.	£4,078	0	0
Edward Conder	4,042	0	0
William Brass	3,897	0	0
Clarke & Bracey	3,893	0	0
B. E. Nightingale	3,850	0	0
T. R. Berrill	3,795	0	0
Macey & Sons	3,422	0	0
Geo. Shaw	3,370	0	0
Geo. Amery (accepted)	3,355	0	0

For addition to varnish factory at West Fields, Mitcham for Messrs. Crease & Son. Mr. T. Milbourn, architect:—

Lawrence (accepted)	£433	0	0

For the erection of a residence at Goff's-hill, Crawley, for Mr. E. Henty. Mr. William Buck, architect:—

Sharp, Horsham	£4,670	0	0
Rowland & Son, Horsham	4,595	0	0
Peters & Redford, Horsham *	3,750	0	0

* Accepted.

For branch premises for the London and County Bank, Brixton. Mr. Chas. Val. Hunter, architect. Quantities by Mr. R. Griggs:—

Larter & Son	£3,585	0	0
Marsland	3,296	0	0
Smith & Co.	3,265	0	0
Rider & Son	3,188	0	0
Higgs & Hill	3,140	0	0

For completing Lawn Villa, Farley-road, Lewisham, for Mr. Frederick Coleman. Mr. Wm. C. Banks, architect:—

J. Taylor & Son	£254	0	0
J. Shuckford	225	0	0
W. J. Vile	223	0	0

For new cattle-market, Skegness, in the county of Lincoln, for the Earl of Scarborough. Mr. James Whitton, architect, Lincoln. Quantities by the architect:—

Contracts Nos. 1 and 2.—Buildings.

Spencer, Peterborough	£1,382	0	0
Rassall, Castleford	1,252	0	0
Hobson, Hogsthorpe	1,216	0	0
Binns Brothers, Lincoln	1,212	0	0
Lea & Lawson, Skegness	1,211	14	6
Crawshaw, Skegness	1,196	17	0
Holmes, Wainfleet	1,180	0	0
G. Dunkley, Skegness	1,180	0	0
Horton, Lincoln	1,171	13	11
Crosby & Sons, Lincoln	1,171	0	0
Wilson, West Retford	1,149	0	0
Riggall & Hewins, Grimsby *	1,114	13	0

* Accepted subject to slight reduction.

Contract No. 3.—Ironwork only in Cattle and Sheep Pens, Gates, and Fencing.

Peck & Son, Boston	£1,238	0	0 !
Terry, Birmingham	1,032	0	0
St. Pancras Ironworks Co., London	995	0	0
Crick, Boston	983	0	0
Hydes & Wigful, Sheffield	930	6	0
Fen & Co., London	930	0	0
Wood & Sons, Brockley	876	12	0
Gimson & Co., Leicester	870	0	0
Hird, Shipley	839	0	0
Kellet & Macfeggan, Darlington	802	12	6
Newton, Chambers, & Co., Thorncliffe, Sheffield	790	0	0
Messenger & Co., Loughborough	770	0	0
P. Munro & Co., Glasgow	736	0	0
Revill, Lincoln	731	18	5
Barnard, Bishop, & Barnard, Norwich	728	0	0
Taylor & Parsons, Bradford	724	0	0
Barford & Perkins, Peterborough	707	6	0
Young & Akrigg, Hull	692	7	0
Ratcliffe, Doncaster	684	8	4½
Fox & Son, Lincoln	676	14	1
Rainforth & Sons, Lincoln	668	0	0
Tank and Boiler Co., Wolverhampton	663	7	4
Brettel & Co., Worcester	662	14	0
Iron Wire, Wire Rope, and Fencing Co., London	657	19	1
Wilson, West Retford	655	0	0
Woodall, Dudley	651	15	0
Duckering, Lincoln	649	5	0
Lockerbie & Wilkinson, Birmingham	642	0	0
Farmer & Son, Gainsborough	636	1	0
Miller & Sons, Wolverhampton	620	18	0
Fletcher, Wolverhampton	604	4	6
Jukes Coulson, Stokes, & Co., Bromley-by-Bow	590	0	0
Hill & Smith, Brierley Hill	580	0	0
Stephenson & Sons, Boston	575	0	0
Harrison, Louth	573	0	0
Riding, Bury	526	12	2¼
Riggall & Hewins, Grimsby *	508	16	0 !

* Accepted subject to reduction from quantities.

Contract No. 4.—Granite Concrete Paving.

Rassall, Castleford	£482	15	0
Cordingley & Sons, Bradford	472	2	6
Fambrini & Daniels, Lincoln	468	5	0
Williamson & Co., Newcastle	392	10	0
McKay, Bradford *	302	5	0

* Accepted subject to reduction in quantity.

For alterations at the Crown, Bayswater-road, for Mr Tomalin. Mr. H. J. Newton, architect:—

Vears	£520	0	0
Creaton	468	0	0
Langridge	435	5	0
Gill	390	16	0
Beals (accepted)	390	0	

Pewterer's Work.

Heath (accepted).

For the extension of the Lambeth Union Workhouse, Kennington. Mr. T. W. Aldwinckle, architect. Quantities supplied by Messrs. R. L. Curtis & Sons:—

Jones	£20,413	0	0
Nightingale	19,370	0	0
Staines & Son	18,974	0	0
Ennor Julian & Co.	18,730	0	0
Crockett	18,550	0	0
Smith	18,483	0	0
Higgs & Hill	18,340	0	0
Gregar	17,484	0	0
Shepherd	16,759	0	0
Brealey (accepted)	16,500	0	0
Judd (withdrawn)	15,000	0	0

For stables, Uxbridge-road, Shepherd's-bush, for the London General Omnibus Company. Mr. A. Tosh, architect. Quantities by Mr. Bolton:—

Crabb	£3,600	0	0
Julian	3,430	0	0
Haynes	3,250	0	0
Richardson	3,049	0	0
Ward & Lamble	3,033	0	0
Gentry	2,990	0	0
Richeirs & Mount	2,921	0	0
Beale	2,848	0	0

For rebuilding back portion of No. 12, Rathbone place. Mr. C. E. Evans, architect. Quantities by Mr. G. Fleetwood:—

Roberts Brothers	£2,378	0	0
E. Toms	2,314	0	0
Patman & Fotheringham	2,254	0	0
Braid & Co.	2,236	0	0
M. Manley	2,197	0	0
Ashby Brothers	2,115	0	0
J. Outhwaite & Sons	2,100	0	0
R. Perkins	2,019	0	0
J. Grover (accepted)	1,984	0	0

For erection of a set of lace-dressing rooms at Old Basford, Nottingham. Mr. Herbert Walker, architect. Quantities by the architect:—

W. H. Cooper, London	£9,497	0	0
H. Scott, Nottingham	8,950	0	0
Fish & Son, Nottingham	8,906	0	0
Cargill, Basford	8,850	0	0
Wooll Brothers, Nottingham	8,700	0	0
Hind, Nottingham	8,287	0	0
H. Vickers, Nottingham	8,250	0	0
McCulloch, Bulwell	7,965	0	0
Wheatley & Maule, Nottingham	7,850	0	0
Bains & Turton, Basford	7,752	0	0
Bell & Son, Nottingham	7,706	0	0
J. F. Price, Nottingham	7,590	0	0
W. Diamond, Leicester	7,361	0	0
W. Stainforth, Bulwell (accepted)	7,511	0	0
Bocock (withdrawn)	6,800	0	0

For roads and sewers, Dartmouth Park Hill Estate, Highgate. Messrs. A. & F. Carter, surveyors:—

Crockett, Camden Town	£2,800	0	0
Hoare & Sons, Blackfriars-road	2,395	0	0
Walker, Upper Holloway	2,317	15	0
Killingback, Camden Town	2,197	0	0
Ford & Co., Westminster (accepted)	2,150	0	0
Taylor, Pimlico	2,148	0	0

For alterations, painting, &c., at the baths and wash-houses, Endell-street, Bloomsbury, for the Commissioners. Mr. A. R. Pite, architect:—

Larter & Sons	£1,050	0	0
Patman & Fotheringham	984	0	0
Cowland Brothers	954	0	0
Hobson	896	0	0
Staines & Son	886	0	0
J. W. Falkner	885	0	0

For additions to Walmer Lodge, No. 71, Avenue-road, Regent's Park. Mr. Fredk. W. Muncey, architect. Quantities by Mr. Joseph Robson:—

Adkins	£334	0	0
Hearle & Sons	324	0	0
Thomas	308	10	0

For draining, &c., to basements of Nos. 83 and 85, Prince of Wales-road, Haverstock-hill, for Mr. F. W. Rowney. Messrs. Ebbetts & Cobb, architects:—

R. Perkins (accepted)	£139	0	0

For alterations at the Union Workhouse, Chippenham. Mr. R. Darley, architect:—

Smith, Chippenham	£151	0	0
Besant, Chippenham	141	0	0
Bromley, Corsham	138	0	0

For alterations and additions to premises, Nos. 97 to 101, Newington Causeway. Mr. Fred. Wheeler, architect. Quantities by Mr. James Kennedy:—

Bruce	£854	0	0
Taylor	837	0	0
Axford	772	0	0
Hanson (accepted)	727	0	0

For erecting new schools, Christ Church Parish, Eastbourne, for the Rev. R. Allen, vicar. Messrs. Scott & Hyde, architects. Quantities by Mr. F. W. Hyde:—

Crowe Brothers	£897	0	0
J. Peerless	893	0	0
S. Norman	882	0	0
Longley	833	0	0

For additions and alterations to the Church of the Annunciation, Washington-street, Brighton, for the Rev. A. D. Wagner. Messrs. Scott & Hyde, architects. Quantities supplied by Mr. F. W. Hyde:—

J. Stenning	£1,075	0	0
Longley	1,062	18	0
Patching & Son	984	0	0
J. Barnes	962	0	0
Lynn & Son	898	0	0
Cheesman & Co.	894	0	0

For an addition to the schools for the district of St. John the Evangelist, Holborn. Mr. Keith D. Young, architect. Quantities by Mr. Morgan Young:—

Campion	£1,153	0	0
Dove Brothers	1,110	0	0
Green	1,106	0	0

For finishing carcasses on the Grove Estate, Leytonstone, for Mr. Henry Lewis. Mr. Charles Teague, architect:—

T. Pallett	£350	0	0
J. Manning (accepted)	324	13	0

For pulling down and rebuilding the Duchess of York Public-house, Darwin-street, Walworth, for Messrs. Truman, Hanbury, & Buxton. Mr. W. E. Williams, architect:—

Marr (accepted).

TO CORRESPONDENTS.

Architect (illegible; if our correspondent has not "time to write clearly," we have not time to waste over his scrawl). — Deodar (no) —H. & Co. (quite satisfactory).—G. W. & Co.—W. A. G —B. & M. —H. T. N.—J. B.—R. W. S.—W. & J. R. F.—B. & Co.—W. C B.—J K O.—J. D. C.—A. & F. C.—H. V —W. McL.—W. H. B.—H B. —T. K.—F. B.—Messrs. A.—J. W.—T. H. W.—A. T.—A. T. T.—J. D.—L H. L —H. & C.—H. I. N.—C. & W.—Dr. P.—C. E. M.—G. H. S —M. Y.—Messrs. E. & Son.—A. J. B.—T. S.—E. N. C.—C. T.—Messrs. C. & Son.—R. M.—S. & Son.—Practical.—W. W.—F. W. E —F. B. W.—G. O.—B. M. (under consideration).—J. D. C. (next week).—A. E. W. (next week).—B. K. (next week).

All statements of facts, lists of tenders, &c. must be accompanied by the name and address of the sender, not necessarily for publication.

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